

# MARINE REVIEW.

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No. 1.

## Discouraging Outlook in Freights.

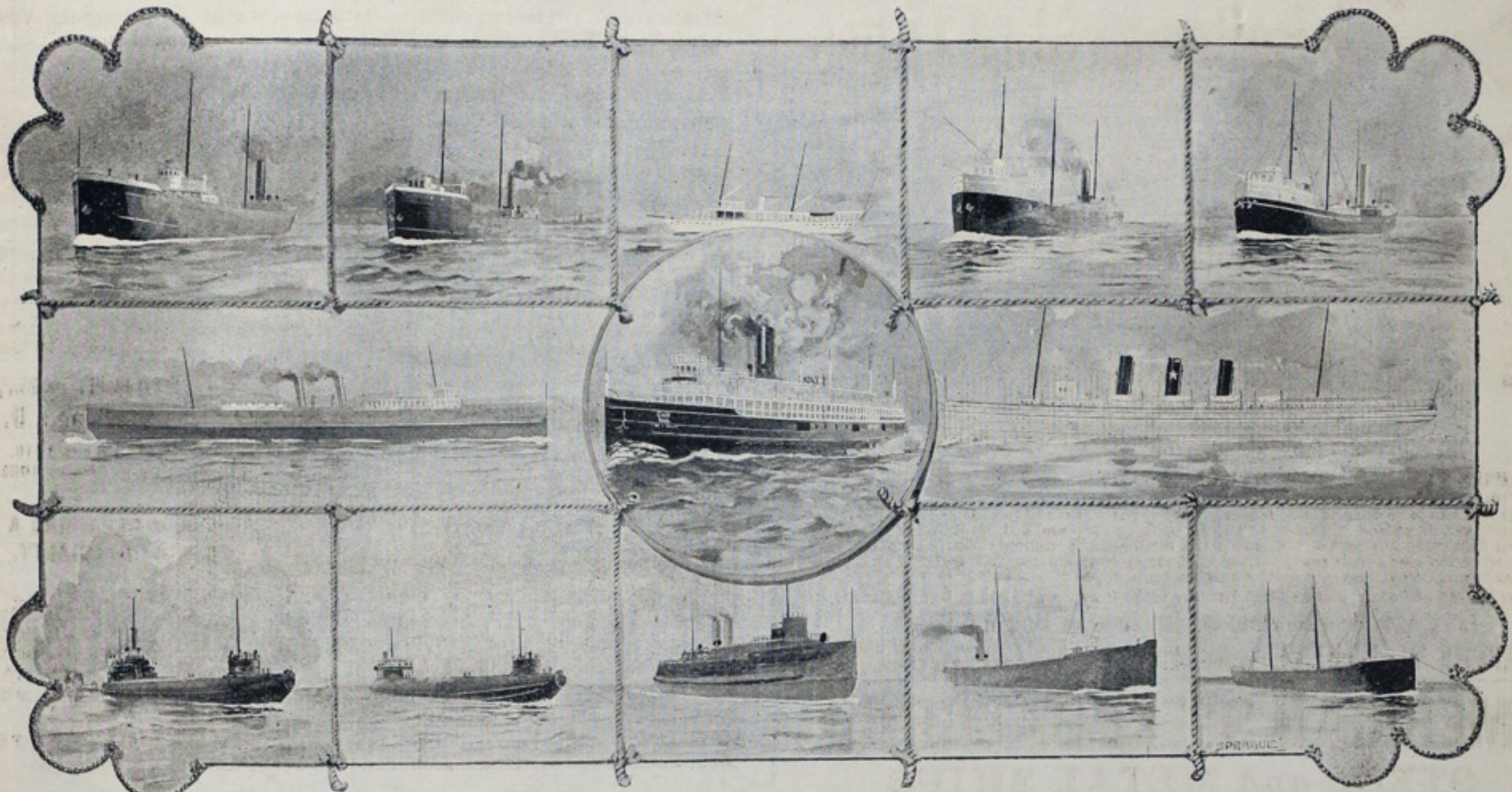
It might be expected that with sales of iron ore aggregating little more than 60 per cent. of the output that was figured on in the spring, ore dealers would be disposed to reduce prices and endeavor by that means, to sell more of their product and thus bring about some relief from the crowded condition of docks and absence of shipping orders from furnaces, which has resulted in a reduction of lake freight rates to about the level of depression of 1894. But the ore dealers claim that no relief would come from such a change of policy, and they are probably right, as the depression extends to every branch of the iron industry, and the matter of price is not a ruling factor.

Lake freights are now down to a basis of 65 cents on ore from Duluth, Ashland and other points at the head of Lake Superior and 45 cents from Escanaba. This is within about 5 cents of the rates at which vessels were placed in ordinary in 1894, but there is less probability now of a movement to tie up ships, as the liberal amount of contracts held by vessel owners will cause them to run all of their ships on very meager margins, or even at a loss in some cases, rather than have any of them quit

## Change in Plans of Rockefeller Ships.

It has been learned at the ship yards of both the Globe Iron Works Co. and the Cleveland Ship Building Co. that plans for crews' quarters on steamers of the Rockefeller fleet building at these yards have been entirely changed. Mr. Bowers, general manager of the company, admits that such is the case, and he adds that if it had been possible to do so, the steamer Sir Henry Bessemer, which goes into commission with the close of the present week, would be changed alike to the other ships. As at first planned, all of the steamers of the new line were to have clear decks, in accordance with the design of steamers like the Victory and the Queen City, the latter of which has just been completed by the Cleveland Ship Building Co. In these vessels quarters for practically the entire crew are below deck in the forward part of the ship, just under the captain's quarters and pilot house. The dining room in the after part of the ship is on the main deck, and the aim, entire, has been to leave, as far as possible, a clear spar deck.

All this will now be changed in the Rockefeller ships, by putting on a steel deck house aft, increasing the size of captain's quarters forward



[From Blue Book of American Shipping.]

### REPRESENTATIVES OF THE 1896 LAKE FLEET.

CORALIA.

NEW UNION LINE STEAMER.

ENQUIRER.

W. D. REES.

NEW DAVIDSON STEAMER.

F. & P. M. CAR FERRY.

CITY OF BUFFALO.

NORTH LAND.

FRANK ROCKEFELLER AND BARGE.

SHENANGO No. 2.

MARICOPA AND BARGE.

entirely. There is little hope of any increase in the grain movement during the present month, however, and no telling how far the present depression may extend itself before grain begins to move again in August. In the meantime, all interests concerned in the lake trade must be satisfied with the feeling that the amount of iron ore thus far purchased is by no means sufficient to supply furnaces until next spring, and that when further purchases are made the change in business for the closing months of the season will be of a marked kind.

It is rather discouraging to compare rates of freight at present with those of a year ago, although it might be well to note that profitable carrying charges were not secured in 1895 until the fall grain movement set in. At this time a year ago the rate on ore from the head of Lake Superior was 85 cents. It had advanced to that point from 75 cents, which was the opening rate in the spring of 1895. A 90-cent rate was not secured last year until Aug. 3, and it was very late in August when the real boom in freights set in.

Shipments of hard coal out of Buffalo thus far this season are 114,000 net tons greater than they were in 1895. The shipments to July 1 aggregate 644,183 tons, of which 348,849 tons was moved in June.

and providing quarters above deck forward for such of the crew as are housed in that part of the ship. Dining room, galley, stewards' and engineers' quarters aft will all be in the steel deck house, and in fact the entire plan of apartments for the crew will be equal to that of the best freight ships on the lakes. Even the Bessemer, which is ready for service and can not be changed, will be taken to the Globe yard next winter and will have a steel deck house put on aft.

Mr. Bowers was not disposed to talk about causes leading up to this change in plans for the vessels, but it is quite evident, from statements which he made some time ago about a policy of securing and keeping the best men that it is possible to get on the vessels, that these alterations are due to his scheme of management. He is reported to have said on several occasions that he proposes to offer every inducement for crews to remain aboard these vessels, year after year, and to seek promotion, with a full understanding that they are to be promoted if they are deserving of it, and that a system of advancement, from firemen up, is to be encouraged on the company's boats. The scheme is certainly commendable and this first move in providing ample and wholesome quarters for the men is in the right direction.



### Anthony J. Drexel's Big Yacht.

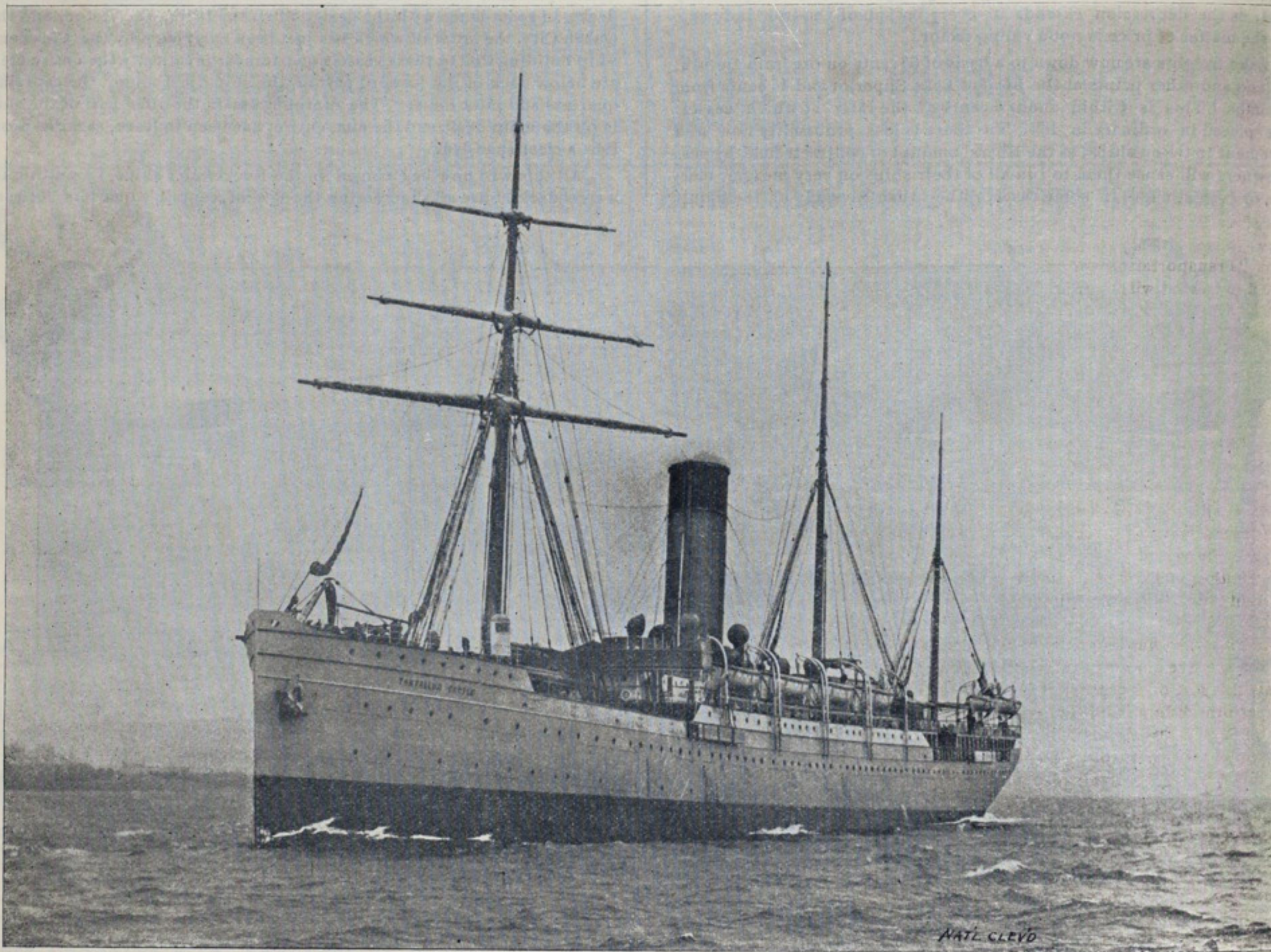
The big steel steam yacht Margarita, building for Anthony J. Drexel of Philadelphia at the works of the Ailsa Ship Building Co., Troon, Scotland, was launched a few days ago. This is one of the largest yachts ever built for an American. She is 246 by 33¼ by 20 feet and of 1,350 tons yacht measure, and was designed by G. L. Watson. The vessel has topgallant forecastle and shade deck, and is schooner-rigged with two pole masts. In the forward part of the ship there is a large dining saloon surmounted by a dome, filled in with richly stained glass, and there are three large staterooms, children's room, pantry and bath rooms. In the after part is situated the owner's stateroom, which is a splendid apartment, extending the whole width of ship, with dressing and bath rooms communicating. Aft of this there is a long passageway with guests' rooms, doctor's room, bath room, maid's room, and wardrobe room on either side of same. Further aft there is a separate compartment with cabins

the latter being placed aft and controlled by shafting from bridge amidships. She has two steam launches, and two racing cutters besides the usual complement of boats on davits.

### Where Hay Lake Channels Will be Widened.

In the office of Col. Lydecker, United States engineer, Detroit, bids were opened, a few days ago, on three dredging jobs, involving an expenditure of about \$100,000, and which are intended to furnish better facilities at those points in Hay lake channel which are at present most difficult of navigation. The successful bidders are said to be H. T. Dunbar, Hickler Bros. and Hingston & Wood. The three items of work will be known to the engineers and contractors as items E, F and G. The work is to be begun on or before July 15 and completed on or before Dec. 1 of this year.

Item E will widen the channel 150 feet, beginning at a point just be-



BRITISH STEAMER TANTALLON CASTLE.

This steamer is a sistership of the Drummond Castle, one of the regular mail liners between Cape Town and London, which was wrecked in a fog a few days ago, with 144 passengers and 103 officers and crew, on an island east of the French coast, only two members of the crew and one passenger being saved.

entering from deck for stewards and servants. On the main deck amidships there is a large range of houses. At the extreme fore end is a large cabin beautifully fitted up as a library, and at the after end a boudoir or drawing room. The cabins and staterooms are principally fitted up with polished mahogany. The machinery is being constructed by Messrs. David Rowan & Son, and consists of two distinct sets of quadruple expansion engines, each having four cranks, and to work at a steam pressure of 200 pounds per square inch. The boilers are of the single-ended description, and are to be worked by forced draught. The yacht is to be fitted with all the newest up-to-date appliances throughout for the working of the ship and the comfort of those on board. There is fitted a very complete installation of electric light, a special feature being an arrangement of lights for illuminating the ship and rigging; also a powerful search light, refrigerating machinery with ice rooms, a complete system of water heating throughout the rooms, and a system of ventilation by electric fans, every room in the ship having at least one fan. The yacht has a powerful steam windlass, steam capstan and steam steering gear,

low where the well-marked bank of island No. 1 ends, and in connection with work now in progress, will materially improve the channel in the upper end of Hay lake; that is, this channel will not be less than 450 feet wide at any point below where the visible banks clearly define it.

Item F simply affords more room for turning at the angle at the foot of Hay lake.

Item G widens, by 50 feet, the channel below where the Middle Neebish dike clearly defines it, and also, by widening the angle at the head of Little Mud lake where the vessels turn from the Middle Neebish channel, gives more room at this turning point.

Democratic Convention Notes—Tickets are on sale July 3d, 4th, 5th and 6th via the Nickel Plate road at rates lower than on other lines. Returning until July 12th. 130 July 3

A ticket to Chicago via the Nickel Plate road is sold for \$1.50 less than via other lines. A perfect passenger service. 153-July 31



### Gen. Casey's Skill in Estimates on Engineering Work.

The skill shown by the late Gen. Casey, chief of army engineers, in estimating in advance the cost of engineering will be better appreciated when we recall the errors made by others in similar calculations. The estimated cost of the Manchester ship-canal was \$28,750,000. Nearly \$80,000,000 was spent before the canal was ready for business. The international commission reported in 1856 that the cost of digging the Suez canal would certainly not exceed \$40,000,000. It had cost \$94,500,000, to say nothing of Egypt's gratuitous building of light-houses, dredging of the harbors, advance of money without interest, and gift of forced labor, the whole amounting to \$20,000,000 more. Engineers spent a year collecting data for their report on the Congo railroad, which, they asserted, could be built for \$5,000,000. They now say that the total cost will be from \$12,000,000 to \$13,000,000. The egregious underestimate of the cost of the Panama canal nearly swamped that enterprise before wholesale stealing completed the ruin. The forts on the Meuse river, estimated at \$4,500,000, cost \$16,000,000; the Corinth canal cost \$12,000,000, instead of the estimated \$6,000,000; a harbor and a railroad on the Island of Reunion cost \$13,500,000, instead of \$6,800,000; the Senegal railroad, which was to be completed for \$2,600,000, absorbed \$9,000,000, and the Langson railroad in Tonkin, which was to open a conquered province for an expenditure of \$500,000, bled the French treasury to the tune of \$4,367,790.—Army and Navy Journal.

### More Attention Given to Lake Shipping.

In the June number of the Journal of Political Economy, a high-class scientific publication issued from the University of Chicago, Professor George Tunell, who is connected with the university, has an article on "Transportation on the Great Lakes of North America." The subject is treated with a great deal of care. Sources of information are given in all cases, and Mr. Tunell has evidently sought to avoid entirely the use of worthless estimates regarding the general volume of lake commerce. But he falls into the error of accepting, as fairly reliable, the reports of the army engineer office at Detroit regarding the commerce passing through the Detroit river at Detroit. These figures are about as worthless as all others that emanate from collectors of customs on the lakes. It is unfortunate that most people who try to prepare statistics of lake commerce are not aware of defects in regulations governing vessels engaged in the coastwise trade on the lakes, which make it impossible to secure reliable statistics from collectors of customs. Mr. Tunell criticises comparisons sometimes made between lake and rail carrying charges. He says:

"Another method of presenting lake freight rates in a very favorable light is by contrasting them with rail rates, which is usually done in the following manner: The average charge on all the railroads in the United States for hauling one ton one mile for some year is compared with the average amount exacted for similar service on the lakes. Obviously this sort of a procedure is unfair to the railways, for the service they perform differs from that rendered by the lake carriers. The railroad tonnage is largely made up of local freight, while the freight tonnage of the lakes is through traffic, and is composed of but few commodities, all of which are handled in large quantities. This characteristic of lake commerce is of the greatest moment, for it makes specialization in the shipping business possible, and assures a full cargo of one article at one port. It is needless to say that rates on the lakes would not be as low as they are if it were necessary to so construct vessels as to enable them to carry a variety of commodities and if they were compelled to go to a number of ports to collect the cargo; and then too, it is to be remembered that the lake hauls are usually very long ones—a fact that has a most important bearing on rates.

"Still another way of showing the relative cost to the public of the lake and rail service that is often resorted to, is the comparison of the lake and rail rates on some commodity which is transported in large quantities, and for long distances by both carriers. Wheat and corn are such commodities. Have we here the proper conditions for a comparison? Clearly the circumstances are much nearer what they should be than they were in the case of the comparison of ton mile charges, but even in this instance the conditions are not exactly fair. Allowance ought to be made for the fact that the national government not only provides the lake carriers with channels and harbors free of charge but also maintains them in good condition without compensation. In addition there are minor factors that favorably affect the cost of the service rendered by the lake carriers; such as the liberality displayed toward the shipping interest by some of our state legislatures in the matter of taxation, and the fact that the railroads continue their service during the winter when the cost of service is manifestly much greater than during the summer. Thus it must be granted that even in the case of comparison of the lake and rail rates for some commodity which is transported in large quantities and for long distances by both carriers, we have not found a fair basis upon which the freight charges of the two transportation agencies can be contrasted, because the community as a whole comes to the assistance of the carriers, and because the service is rendered by

one of the carriers at all times and by the other only at certain seasons under favorable circumstances. Then, too, it must be remembered that in the transportation of such commodities as iron ore, coal, grain and lumber, the lake carriers are operating with commodities which their equipment enables them to handle to best advantage. If the cost of service to the shippers on all kinds of freight were to be inferred from the rates on local freight, the comparison would not issue so favorably to the carriers."

Two tables in Mr. Tunell's article are thought worthy of reproduction. One of them, dealing with lake freight charges on wheat from Chicago to Buffalo, is reproduced for the reason that it covers a greater number of years than any other table of the kind that we have seen of late. The other deals with railroad freight charges for an equally long period. They are as follows:

FREIGHT RATES ON WHEAT (PER BUSHEL) BY LAKE FROM CHICAGO TO BUFFALO \*

Year.	Cents.	Year.	Cents.	Year.	Cents.
1857	9.89	1870	5.88	1883	3.41
1858	3.76	1871	7.62	1884	2.18
1859	5.08	1872	11.46	1885	2.02
1860	9.89	1873	7.62	1886	3.68
1861	11.53	1874	4.03	1887	4.13
1862	10.49	1875	3.42	1888	2.56
1863	7.51	1876	2.99	1889	2.51
1864	9.58	1877	3.72	1890	1.96
1865	9.78	1878	3.07	1891	2.38
1866	12.34	1879	4.74	1892	2.19
1867	6.67	1880	5.76	1893	1.66
1868	7.14	1881	3.44	1894	1.27
1869	6.81	1882	2.50	1895	1.97

\*From reports of Chicago Board of Trade and New York Produce Exchange.

FREIGHT CHARGES PER TON PER MILE ON EIGHTEEN TRUNK RAILROADS OF THE UNITED STATES.

Year.	Cents.	No. of roads averaged.	Year.	Cents.	No. of roads averaged.	Year.	Cents.	No. of roads averaged.
1857	2.789	6	1870	2.513	14	1883	1.188	17
1858	2.956	7	1871	1.924	11	1884	1.087	17
1859	2.735	8	1872	2.101	13	1885	1.022	17
1860	2.593	9	1873	1.988	14	1886	.988	17
1861	2.434	9	1874	1.869	17	1887	.971	17
1862	2.687	9	1875	1.686	17	1888	.824	16
1863	2.990	12	1876	1.574	18	1889	.922	16
1864	4.501	12	1877	1.505	18	1890	.884	17
1865	3.201	11	1878	1.379	18	1891	.868	17
1866	3.235	12	1879	1.244	18	1892	.799	17
1867	2.884	11	1880	1.292	17	1893	.800	17
1868	2.741	13	1881	1.215	17	1894	.820	18
1869	2.512	12	1882	1.190	17	1895	.....	...

The following railroads form the list: New York Central; Pennsylvania; New York, Lake Erie & Western; Boston & Albany; Philadelphia & Erie; Lake Shore & Michigan Southern; Michigan Central; Chicago, Burlington & Quincy; Chicago & Northwestern; Chicago, Milwaukee & St. Paul; St. Louis, Iron Mountain & Southern; Chicago, Rock Island & Pacific; Illinois Central; Chicago & Alton; Pittsburg, Fort Wayne & Chicago; Chesapeake & Ohio; Maine Central, and the Mobile & Ohio. The number of roads which helped to form the average is given in each case.

Down to 1871 the charges of the various roads were obtained from part 1, page 615, of "Senate Report on Wholesale Prices, Wages, and Transportation," from which the averages have been computed; since 1871 from United States treasury department reports on internal commerce of the United States and from "Poor's Manual of Railroads."

The big steamer building at the Vulcan yard, Stettin, for the North German Lloyd Company, and which is to vie with the famous Cunarders Campania and Lucania, will be 625 by 66 by 43 feet, and her engines will develop 28,000 horse power. A similar ship is also being built at another German works, that of Mr. Scichau at Dantzig. Another of the big German shipping corporations, the Hamburg-American company, is having built at Harland & Wolff's yard, Belfast, Ireland, a steamer that will be the biggest freight carrier in the world. Her dead weight will be over 12,000 tons and her dimensions are 560 by 62 by 41 feet.

The Blue Book of American Shipping answers questions that arise daily in every vessel agent or owner's office. If the book is not satisfactory it costs nothing, as the \$5 will be returned. Order at once, No. 409 Perry-Payne building, Cleveland.

Purchase a ticket to New York City via the Nickel Plate road and save \$1.00, either first or second class. Through trains with dining cars and sleepers.

154 July 31

Uniformed colored porters attend to the wants and comfort of first and second-class day coach passengers on the through trains of the Nickel Plate road. Rates lower than via other lines.

135 July 3



### Bids Called for on the New Torpedo Boats.

The navy department has prepared a draft of an advertisement inviting bids for the construction of the thirteen torpedo boats recently authorized by congress. Three of these boats must have a speed of 30 knots an hour and the others are divided into two classes, one of 22½ knots and the second of 20 knots. No premium is offered for excess of speed. Contracts must be entered into before Oct. 8, 1896. The plans for the 30-knot vessels are to be submitted by the bidders, while proposals for those of the other two classes may be submitted on plans prepared either by the department or the bidders. In its advertisement the department gives the following approximate dimensions for the 20 and the 22½-knot vessels:

Type No. 1, 20 knots—Length on load line, 105 feet; beam on load line, 12½ feet; mean draft, 4½ feet; displacement, about 68 tons; indicated horse power, about 850; armament to consist of two single-deck torpedo guns, one 1-pounder rapid fire gun, two automobile torpedoes, 180 rounds 1-pounder ammunition. If the speed falls below 20 knots an hour and exceeds 19 knots, the boat will be accepted at a reduced price—the reduction being at the rate of \$10,000 a knot. If the speed falls below 19 knots an hour, the boat may, in the discretion of the secretary of the navy, be rejected, or accepted at an agreed reduced price.

Type No. 2, 22½ knots—Length on load line, 140 feet; beam on load line, 14½ feet; mean draft, 4¾ feet; displacement, about 105 tons; indicated horse power, about 1,700; armament to consist of three single-deck torpedo guns, three 1-pounder rapid fire guns, four automobile torpedoes, 504 rounds 1-pounder ammunition. If the boat attains a speed of 21½ knots, she will be accepted at a reduced price, the reduction being at the rate of \$10,000 a knot. If the speed falls below that, the boat may, at the discretion of the department, be rejected, or accepted at a reduced price mutually agreed upon between the secretary and the contractors.

By the act of congress not more than three of these boats can be built by one firm, and provision is made for the building of three of the boats on the Pacific coast, one on the Mississippi river, one on the Missouri river and one on the coast of the Gulf of Mexico, provided that they can be built at those places at a fair cost.

### Stocks of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes on June 27, 1896:

	Wheat, bushels.	Corn, bushels.
Chicago.....	13,656,000	5,677,000
Duluth.....	9,092,000	13,000
Milwaukee.....	436,000	2,000
Detroit.....	63,000	12,000
Toledo.....	235,000	41,000
Buffalo.....	969,000	349,000
Total.....	24,451,000	6,094,000

As compared with a week ago, the above figures show at the several points named an increase of 290,000 bushels of wheat and 329,000 bushels of corn.

### Doctor of Engineering.

At the commencement exercises of the graduating class of '96 from the Stevens Institute of Technology, Hoboken, N. J., held June 18, the degree of doctor of engineering was conferred by the faculty and trustees upon Commodore George W. Melville, engineer-in-chief of the United States Navy, in appreciation of the excellent engineering work performed by Commodore Melville for his country and the advancement of the science of steam engineering, well illustrated in the world-wide famed white squadron. Only once before in the twenty-five years' history of the Stevens Institute has the degree of doctor of engineering been conferred and then upon Prof. R. H. Thurston of Rhode Island, who formerly occupied the chair of mechanical engineering in Stevens Institute, and is now director of Sibley College, Cornell University.

During one week recently the International Navigation Co., which is the parent corporation controlling the American Line, had in New York the steamers Paris, St. Louis, Southwark, Westernland and Berlin, aggregating 43,000 tons and 58,200 horse power, a greater tonnage and a greater horse-power than any company ever before had in any port of the United States at one time.

The Seymour Manufacturing Co. of Seymour, Conn., is enlarging its boiler house, and the new portion of the building will be constructed entirely of steel, in order to make it absolutely fire proof. The contract for the steel work has been let to the Berlin Iron Bridge Co. of East Berlin, Conn.

All reliable statistics relating to shipping are contained in the Blue Book of American Shipping. Price \$5. MARINE REVIEW, Cleveland.

### Around the Lakes.

Capt. Joseph Bowen, whose death was announced a few days ago, and who had followed the lakes for about forty years, was buried at his late home, Lorain, O., on Wednesday.

Mr. J. W. Walton of the Upson-Walton Co., Cleveland, leaves to day (Thursday) for a European trip, on which he intends to make hurried visits to a great number of interesting points in England and on the continent.

Officials of the Northern Steamship Co. report a marked increase, within the past two weeks, in the tourist travel on their big passenger ships North West and North Land. The patronage is far above that of last season.

Quite a large amount of dredging is to be done immediately at the docks of the "Big Four" company, Sandusky. This railway company is preparing for more extensive shipments of coal in the future from Sandusky to Lake Superior points.

Bids for constructing the extension from Butler, Pa., to Pittsburg of the Conneaut ore and coal railway, for which the Carnegie company is providing funds, were to have all been in on Wednesday last. The Carnegie company will furnish the rails. The road will have only a single track but there will be numerous sidings. It will not be regarded as a passenger road.

Letters bearing the following names await claimants at the marine post office, Detroit: Hiram Adams, Mrs. J. Cronan, W. H. Crawford, A. A. Fowlie, James Gibson, Lewis Herrington, Morman H. Humphrey, Wm. H. Hayner, Joe Jacques, Fred Lock, Anthony Lawrence, W. H. McClellan, C. G. Miner, Mrs. Lina Phillips, Willie Pingle, Mrs. Thos. G. Reed, Joiney C. Remming, Wm. Roediger, Theophilus Smith.

Three more lake charts, all on a large scale, have been issued within the past week by the United States hydrographic office. One of them covers that part of Lake Erie in the vicinity of Point au Pelee, where quite a number of groundings occurred last fall. Several shoal spots not found on other charts are shown, as a result of the survey made by the U. S. S. Michigan. This chart is held at \$1.50. Another chart takes in the Detroit river from Bar point to Mamajuda light-house, corrected up to the present month. It sells at \$1. The third chart is of South Chicago and is also held at \$1.

The Minnesota Steamship Co's steamers Mariposa and Maritana and the Mutual line steamer Corsica have distinguished parties of iron men aboard on their present trip to Lake Superior. On the Mariposa and Maritana were two parties, which included H. C. Frick of the Carnegie Steel Co., J. C. Morse of the Illinois Steel Co., President Bacon of the Minnesota Iron Co., A. W. Mellon and Judge Knox of Pittsburg and Ralph Hickox of Cleveland. Mr. L. C. Hanna, president of the Mutual line, had with him on the Corsica Mr. Currie of the Carnegie Steel Co., and Mr. Oliver of Pittsburg, who is interested in large Mesabi range mining properties. The members of both parties control some of the largest iron mines in Minnesota.

Mr. E. V. Smalley, the well-known journalist who was at one time connected with Cleveland newspapers, contributes a most thorough and authentic study of William McKinley's character to the July number of the Review of Reviews. Mr. Smalley's intimate knowledge of republican party politics and long acquaintance with the public men of Ohio render him peculiarly adapted for such a task. He was born and reared on the Western Reserve, only forty miles from McKinley's Poland home, and he writes with full personal knowledge of the Major's early environment. The article is well illustrated.

It is again announced that there will be considerable shifting around of officers of the army engineer corps when recommendations regarding appropriations in the river and harbor and fortifications bills are passed upon by the secretary of the treasury. It is understood that Gen. Craig-hill, chief of army engineers, has prepared a slate for the stations of officers under him when the new work is entered upon, but it will not be made public until it has been passed upon by the secretary.

Two Japanese naval constructors were in Washington, a few days ago, and will visit the yard of the Cramps as well as that of the Union Iron Works, San Francisco. Their visit has again caused talk of the Japanese government placing a few orders here for war ships.

Captains will find some 75 or 100 pages of the Blue Book of American Shipping devoted to their interests. Write to the MARINE REVIEW, Cleveland, for reasonable terms upon which the book may be obtained by men aboard vessels.

The solid through trains between Chicago, Buffalo, New York and Boston via the Nickel Plate road are models of modern equipment. Rates lower than via other lines.



## Ship Yard Matters.

Twelve new vessels are given ratings and valuations in the July supplement of the Inland Lloyds Vessel Register. They are as follows: Steamers—Aragon, Detroit Dry Dock Co. for C. R. Jones and others, Cleveland, \$135,000, A1; E. W. Oglebay, F. W. Wheeler & Co. for D. C. Whitney of Detroit, \$215,000, A1. Steam yachts—Pathfinder, owned by Mr. Morgan of Chicago, \$70,000, A1; Sentinel, owned by L. C. Wachsmuth of Chicago, \$20,000, A1½. Tugs—W. & J. Connell, O'Grady & Maher for W. & J. Connell of Oswego, \$8,000, A1; S. M. Fischer, Craig Ship Building Co. for Lake Michigan Car Ferry Co., \$50,000, A1; James T. Martin, owned by Thompson Tug Co. of Port Huron, \$8,000, A1; Geo. D. Nau, owned by Geo. D. Nau and others, Green Bay, \$16,000, A1. Schooners and barges—Charles Chambers, owned by Charles Chambers and others, Grosse Isle, \$2,000, A2; Abyssinia, and Algeria, built and owned by James Davidson of West Bay City, each \$85,000 and each A1\*; Vineland, Abram Smith & Son for F. W. Gilchrist of Alpena, \$48,000, A1\*. The rebuilt steamer Britannic is given a valuation of \$80,000 and A1\* rating, with Alvin Neal of Port Huron as managing owner. The schooner Moonlight, which was purchased by J. C. Gilchrist of Cleveland after her release from the beach near Marquette, and which has had some repairs in Cleveland, is valued at \$20,000 and rated A2. Class and valuation for the Kent, which was released with the Moonlight, and which is also owned by Mr. Gilchrist, have not as yet been fixed.

Two more 400-foot ships will leave Cleveland for Lake Superior within the next few days—the Queen City from the Cleveland yard and the Sir Henry Bessemer from the Globe yard. The Bessemer is the first of the Rockefeller ships. She is expected to carry the largest cargo ever moved from Lake Superior, as she is a duplicate of the Coralia, but does not carry as much weight of material as that boat. The Queen City is owned by A. B. Wolvin and others of Duluth. The Queen City has been delayed somewhat on account of an accident attending the shipment of one of her water tube boilers to Cleveland. It was dropped into the canal at Buffalo while being transferred to a railway car. The boilers are of the Babcock & Wilcox type, similar to those in the steamer Zenith City.

Official numbers and tonnage of new lake vessels recently registered by the bureau of navigation, treasury department, are: Steam—Iowa, Milwaukee, 1,157.47 tons gross, 846.38 net, No. 100,613; Geo. D. Nau, Green Bay, 74.77 tons gross, 50.85 net, No. 86,354; Alert, Buffalo, 102.48 tons gross, 69.69 net, No. 107,227. Sail—G. W. H., Chicago, 24.08 tons gross, 19.86 net, No. 86,355; Siren, Chicago, 16.23 tons gross, 10.60 net, No. 116,721.

The steel steamer Lagonda, owned by Capt. John Mitchell and others of Cleveland, leaves the ship yard of F. W. Wheeler & Co. today, Thursday, for the head of Lake Superior, where she will load ore for Cleveland. Capt. Mitchell and F. C. Smith, who is associated with Mr. E. C. Pope in the ore business, are at Bay City and will be aboard the Lagonda on the trip.

Car Ferry Ann Arbor No. 1 is at the yard of the Craig Ship Building Co., Toledo, where she will receive extensive repairs, which will take up about four weeks of her time. Alterations will include a cabin for passengers.

There is already some talk of candidates for the presidency of the Lake Carriers' Association next year. When in Cleveland, a few days ago, Capt. J. S. Dunham of Chicago was referred to as a candidate for the place, although without any knowledge on his part of the question being discussed. There is a disposition among some members of the association to have the presidency go to Chicago next year, with a view to dividing the honor. Cleveland, Detroit and Buffalo have all been favored with the office, and Chicago, as far as the ownership of vessel property in lake cities is concerned, would be next on the list. Capt. Dunham has for a number of years past been one of the largest owners of tugs on the lakes, but he is managing owner of only one large vessel. This may be against his selection, but he is, of course, known to have taken a great interest at all times in matters of legislation pertaining to the lakes. Several months will elapse, however, before the annual meeting of the association, and the claims of other owners for the honor attending the presidency will undoubtedly be considered in the meantime.

On account of the rapid decline in lake freights within the past few weeks, there has been some talk of reducing the Lake Carriers' schedule of wages, but the suggestion is from only two or three owners and will probably not be acted upon. Vessel owners who have ore contracts would, of course, be decidedly opposed to such a move, and anyhow the general sentiment is in favor of tying up vessels in preference to an attempt at reducing expenses in that way.

The list of American and Canadian vessels, with length and beam, and name and address of managing owner, is up to date, and correct in the Blue Book of American Shipping. Send \$5 for it to the MARINE REVIEW, Cleveland.

## Canada's Merchant Shipping.

The Canadian department of marine and fisheries has again issued a list of vessels on the registry books of the dominion, from which it is learned that the total number of vessels owned in Canada on Dec. 31, 1895, including old and new vessels, sailing vessels, steamers and barges, was 7,262, measuring 825,836 tons, register tonnage, being an increase of seventeen vessels and a decrease of 43,788 tons register, as compared with 1894. The number of steamers on the registry books on the same date was 1,718 with a gross tonnage of 247,007 tons. Assuming the average value to be \$30 per ton, the value of the registered tonnage of Canada, on Dec. 31 last, would be \$24,775,080.

The number of new vessels built and registered in the dominion during the last year was 250, measuring 16,270 tons, register tonnage. Estimating the value of the new tonnage at \$45 per ton, it gives a total value of \$732,150 for new vessels.

As previously noted in the REVIEW, Canada's merchant shipping has been declining at the rate of 25,000 to 50,000 tons a year for five or six years past. For about twenty years previous to 1892 the list of vessels reported each year in the dominion aggregated 1,000,000 to 1,300,000 net tons. Since 1892 there has been a marked decrease in this aggregate, as shown by the following table:

NUMBER AND TONNAGE OF VESSELS ON REGISTRY BOOKS OF THE DOMINION OF CANADA, DEC. 31 OF EACH YEAR FOR THREE YEARS PAST.

PROVINCES.	Dec. 31, 1893.		Dec. 31, 1894.		Dec. 31, 1895.	
	Number of vessels.	Registered or net tonnage.	Number of vessels.	Registered or net tonnage.	Number of vessels.	Registered or net tonnage.
New Brunswick.....	1,010	156,086	1,003	136,257	975	122,417
Nova Scotia.....	2,715	396,263	2,710	371,432	2,683	343,356
Quebec.....	1,426	161,121	1,427	160,590	1,454	158,776
Ontario.....	1,370	146,665	1,480	148,525	1,508	148,669
Prince Edward Island....	188	20,970	191	19,650	190	19,323
British Columbia.....	315	24,900	336	26,455	346	25,988
Manitoba.....	89	6,534	98	6,715	106	7,307
Total.....	7,113	912,539	7,245	869,624	7,262	825,836

## Engineering Publications.

Readers of the REVIEW will remember the great value of engineering information that was collected in two large volumes, which were prepared, under the direction of Geo. W. Melville, engineer in chief of the United States navy, after the meeting of marine engineers and naval architects that was held in Chicago in connection with the World's Columbian Exposition. This collection of papers on marine and naval engineering and naval architecture makes up the most valuable work of its kind that has ever been put in print. The books were sold on subscription, but the New York publishers inform the REVIEW that they have a few left over, on which we can make a reduced price.

A recent addition to the series of royal naval handbooks, published by George Bell & Son, London, is the "Mechanism of Men-of-War," by Fleet Engineer R. C. Oldknow, R. N. The book does not go very far into the technicalities of the subject. It is intended to be of interest not only to the professional engineer, but also to such of the general public as concern themselves with naval matters. There are a number of illustrations of engines of British battleships and several drawings of different types of water tube boilers, a description of which occupies a considerable portion of the book. Received from Burrows Bros., Cleveland.

Capt. Smith, who was in one of the freight steamers of the Northern line last season, and who was the first of the captains selected for the Bessemer Steamship Co.'s vessels, will take out the steamer Bessemer from the Globe yard, Cleveland, on Monday or Tuesday next. Richard Masten is engineer of the Bessemer. Mr. Duncan Fraser, chief engineer of the line, will be aboard the Bessemer on her first trip, as will also two or three of the captains who are to take other boats later on. All captains and engineers of the line have been selected, but the list is not given out, for the reason that a few of them now hold other berths and the matter of their release has not been fully settled to the satisfaction of all parties concerned.

A. Wells Case of Highland Park, Conn., patentee and manufacturer of the Case propeller wheels, says: "Your Blue Book of American Shipping is just what I need. You have done a nice job. Now if the country will do as well for McKinley and Hobart next November I can sell propeller wheels by the cargo."

One dollar round trip excursion tickets between Cleveland and Lorain are on sale by agents of the Nickel Plate road. 78 July 31

Fourth of July Excursion Rates are offered between any two stations within 200 miles on the Nickel Plate road. Ask agents. 132 July 3





DEVOTED TO THE LAKE MARINE AND KINDRED INTERESTS.

Published every Thursday at No. 409 Perry-Payne building, Cleveland, O. by John M. Mulrooney and F. M. Barton.

SUBSCRIPTION—\$2.00 per year in advance. Single copies 10 cents each. Convenient binders sent, post paid, 75 cents. Advertising rates on application.

Entered at Cleveland Post Office as Second-class Mail Matter.

The books of the United States treasury department on June 30, 1895, contained the names of 3,342 vessels, of 1,241,459.14 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1895, was 360 and their aggregate gross tonnage 643,260.40; the number of vessels of this class owned in all other parts of the country on the same date was 309 and their tonnage 652,598.72, so that half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1895, was as follows:

Class.	Number.	Gross Tonnage.
Steam vessels.....	1,755	857,735.13
Sailing vessels.....	1,100	300,642.10
Unrigged.....	487	83,081.91
Total.....	3,342	1,241,459.14

The gross registered tonnage of vessels built on the lakes during the past five years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30,	Number.	Gross Tonnage.
1891.....	204	111,856.45
1892.....	169	45,968.98
1893.....	175	99,271.24
1894.....	106	41,984.61
1895.....	93	36,352.70
Total.....	747	335,433.98

#### ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC.

(From Official Reports of Canal Officers.)

	St. Mary's Falls Canal.			Suez Canal.		
	1895.*	1894.	1893.	1895.	1894.	1893.
No. vessel pass'ges	17,956	14,491	12,008	3,434	3,352	3,341
T'n'ge, net registd	16,806,781	13,110,366	9,849,754	8,448,383	8,039,175	7,659,068
Days of Navigat'n	231	234	219	365	365	365

\* 1895 figures include traffic of Canadian canal at Sault Ste. Marie, which was about 1/2 per cent. of the whole, but largely in American vessels.

IN THE REVIEW of June 18 reference was made to the inconsiderate manner in which lake shipping interests are treated by the United States light-house board. The light-house institution was referred to as the most inefficient branch of the government with which the vessel interests have any dealings. A communication elsewhere in this issue supports this opinion and directs attention to the great loss in government funds that is involved in this service as at present constituted. Simply as an illustration of this waste of money owing to faulty organization it may be noted that on the lakes there are in each district two or more boats, one for the engineer and one for the naval officer, busy for only a part of the time at work which could be as well accomplished by one boat continuously busy. This state of affairs is found also at points on the Atlantic coast and very probably exists all over the country. It is but one of the many items chargeable to poor organization, and which require money that could otherwise be applied directly to improvements and to aids to navigation. Let anyone interested in the subject figure out how much additional money would have been available during the last twenty-five years had the plant of each light-house district, even on the lakes, been restricted to one boat managed from one office. The result would be surprising, and although but one item of the kind referred to, it would give an idea of the additional aids to navigation that the lake interests could be having the use of today, had the light-house service not required an engineer and an inspector in each district, each with a boat of his own. In some cases economy has been practiced by the engineer department by assigning one engineer to two districts, but we fail to note a single instance in which the maximum number of naval officers has not been assigned to this service, each with a boat of his own. Each year the number of these light-house tenders is increased. None of the annual appropriation bills are without items pertaining to them, however much other parts of the service may suffer. And when vessel owners of the lakes ask for gas buoys, which are cheap aids to navigation, specially suited to lake channels on which the government has spent millions of dollars, they learn that an adverse report has been made regarding these buoys, because the dignity of the naval officer and

the yacht like character of his ship (the light-house tender) will not permit him to tow lighters upon which these buoys must be taken to and from their stations. As a capable officer of the government once said, vessel owners should quit approaching the light-house board with hat in hand like beggars asking for what is theirs by right and which congress stands ready to grant them when fair reports are submitted regarding the need of appropriations for lights and other aids to navigation. With a new administration soon to take charge of affairs in Washington, the shipping interests of the lakes should be prepared to demand some radical changes in this service.

CANADA'S entire change of government, brought about at the recent election, may overthrow the plans for a transatlantic steamship service, but, of course, there will be nothing definite in this regard until the new government comes into power and its policy is outlined. For years the successive Conservative administrations, now overthrown, have been trying to establish this new line of communication with the old world. Parliament was, some time ago, induced to vote a substantial subsidy to any company that would provide a fast service. The subsidy is \$750,000 a year for a 20-knot service, by boats of the very best kind. Through the representation of the dominion government the imperial authorities have agreed to supplement this, if necessary, to the extent of \$375,000. Tenders were called for on both sides of the Atlantic, and on the very day on which the present government was defeated at the polls the last of the bids from England were received at Ottawa. The cabinet ministers have had the bids under consideration, and it is understood that of some half dozen offers received the tender from the Allan Line, one of the oldest and largest of dominion shipping corporations, is the lowest, but details have not as yet been given out. The old government has done the preliminary work of interesting capitalists and the mother country in the undertaking, and it will now be turned over to the new administration.

THE JUNE, 1896, number of consular reports, published by the state department, contains an extended and interesting report on the production of iron ore in Germany. The total output of iron ore in the German customs union, in 1894, amounted to 12,392,065 tons, of which 8,433,784 tons were produced in Germany and 3,958,281 tons in Luxemburg. As the quantities of import and export are about alike—2,000,000 tons per year—the above total represents the quantity consumed by the smelting works. The imported ores were chiefly from Spain and Sweden. The report says: "If we look into the reasons for the rapid advance of Germany in all branches of the iron industry, we find that, apart from the improved methods of manufacture, the development of her mineral resources and the subsequently ready supply of iron ore for the blast furnaces is of great importance. Unlike England, with an annually increasing import of ore from foreign countries, and unlike the United States, where the ore makes a long journey from the mine to the works, Germany is favored with an abundance of excellent ore, which will last for generations to come, and with excellent means of transportation and cheap freight rates."

LAKE VESSELS aggregating full 650,000 tons are now registered in the Lake Carriers' Association. This is about 40,000 more than has ever before been in the association, and there is still some prospect of the list being increased materially, as two or three big lines, in addition to the new fleet of the Bessemer Steamship Co., are expected to join the organization before the season is at an end. At 3 cents a ton, which is the rate of dues, the association should have an income this year of nearly \$20,000. All of the money will be needed, however, as a big expense attended the Detroit river bridge fight and other legislation in Washington during the past winter and the number of shipping offices was also increased. Expenses attending private lights are also somewhat greater than they were last year.

ARRANGEMENTS are being made in Washington for the preparation of plans for the two revenue cutters that are to be constructed for the lakes. They will be very nearly duplicates of the cutter now building at the works of the Globe company, Cleveland. But it is not probable that the Globe company, or in fact any of the lake ship builders, will agree to construct either of these two boats at the price at which the steamer now under construction in Cleveland was taken. The experience of the Cleveland company in losses caused by delays and all manner of red tape is similar to what other builders throughout the country have met with in undertaking government work.

Names and addresses of 3,140 marine engineers and portraits of nearly 100 engineers are contained in the Blue Book of American Shipping. It also contains a diagram of a modern triple expansion engine with names of all parts. Special terms to engineers and other employes on lake vessels. Write the MARINE REVIEW, Cleveland.

The Nickel Plate road sells a ticket to Boston for \$1 less than other lines. Through sleepers.



### Big Lake and Ocean Ships Compared.

In the following table dimensions of the two largest vessels now on the lakes—Coralia and Sir Henry Bessemer, built by the Globe Iron Works Co., Cleveland—are compared with the two largest vessels of the United States on the ocean—the St. Louis and St. Paul, which with the exception of the Lucania and Campania are the largest steamships afloat:

	Coralia and Bessemer.		St. Louis and St. Paul.	
	Ft.	In.	Ft.	In.
Length over all.....	432	0	554	2
Length of keel.....	412	0	535	8
Extreme beam.....	48	0	62	9
Depth.....	28	0	42	4

It will be noted that the big ocean liners surpass the largest vessels on the lakes in the matter of length by about 25 per cent., in breadth of beam by about 25 per cent. and in depth by about 50 per cent. The great disparity in the matter of depth is explained by the shallowness of the water in the channels which connect the lakes. But it is understood, of course, that there are few ships on the ocean owned by the United States that approach the dimensions of the St. Louis and St. Paul, while on the lakes there are a hundred or more steel freight steamers that will compare favorably with the latest type of ships represented by the Coralia and Bessemer.



ABOARD FREIGHT STEAMER CITY OF BANGOR.

An illustration of dining room accommodation on modern lake freight steamers. Part of the crew of the City of Bangor at dinner.

### Too Many Cooks in the Government Service.

Editor MARINE REVIEW: Every thinking man who is familiar with the lake interests, and who wishes them success, must, in the main, agree with your remarks about the light-house service in your issue of June 18. The immediate cause of the trouble is probably a desire on the part of the light-house board to control all matters of detail affecting the service, and to repose insufficient trust and responsibility in the district officers. This, the great danger of ultra-centralization, is a noticeable tendency in all departments of the government in recent years, and in many cases has gotten to the point where it is seriously crippling their efficiency.

But the light-house service is additionally hampered. It presents the curious spectacle of a board composed of several persons, taking responsible executive charge of a great business. As well might the directors of a great railroad abolish the office of president of the road, and perform his executive functions as well as their own advisory ones. It is the old evil of too many cooks. To be sure, the secretary of the treasury is nominally the chief of the service, but he has so many more important duties that his authority is practically exercised by the board.

In all these matters that affect the lake interests so closely, the greatest efficiency with the least cost can never be attained until the light-house work, the survey work, and the river and harbor work are all united under one department of the government. The corps of engineers of the war department is better organized for such work than any other branch of the government service, being as yet comparatively free from the evil of ultra centralization mentioned above; but, if, on account of

petty jealousies or any other reason, it be impracticable to give all of this work either to the war department, the navy department or the treasury department, why not in the name of common sense, have a department of public works to attend to all such matters, and leave the other departments to attend to the matters for which they were specially created.

Let us hope that when the "man from Ohio" becomes president, he will look into this subject sufficiently to see that the difficulty is one not of men nor of means but of faulty organization, and let him apply the remedy to the root of the evil, so that the cure may be permanent.

Chicago, June 29, 1896.

CIVILIAN.

### Cargo and Speed Record—Lake Freight Ships.

Iron ore—Coralia, Mutual Transportation Co. of Cleveland, 4,738 gross or 5,307 net tons, Escanaba to Ashtabula, draft of 16 feet 1½ inches; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,569 tons gross or 5,117 net tons, Escanaba to South Chicago, draft of 18 feet. Lake Superior cargoes—Schooner Aurania, John Corrigan of Cleveland, 3,928 gross or 4,399 net tons, Duluth to Ashtabula on 14 feet 4 inches draft; steamer W. D. Rees, Wilson Transit Co., Cleveland, 3,876 tons gross or 4,341 net, Two Harbors to South Chicago, draft of 14 feet 4 inches.

Grain—Selwyn Eddy, Eddy Transportation Co. of Bay City, 130,820 bushels of wheat, Detroit to Buffalo; steel schooner Martha, Minnesota Steamship Co., 165,000 bushels of corn, South Chicago to Erie on 15 feet draft; S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 246,673 bushels of oats, Chicago to Buffalo.

Coal—S. S. Curry, Hawgood & Avery Transit Co. of Cleveland, 4,535 net tons bituminous, Conneaut to Gladstone; Selwyn Eddy, Eddy Bros. of Bay City, Mich., 4,252 net tons anthracite, Buffalo to Milwaukee.

Speed—Owego, Union Line of Buffalo, Buffalo to Chicago, 889 miles, 45 hours and 16 minutes, 16.4 miles an hour; Centurion, Hopkins Steamship Co. of St. Clair, Mich., Buffalo to Duluth, 997 miles, 67 hours and 50 minutes, 14.7 miles an hour.

### Iron Ore Docks at Buffalo.

In the last issue of the REVIEW there was reprinted from the Blue Book of American Shipping a statement giving the equipment of all iron ore docks at Lake Erie ports, with names of dock companies, managers etc. A Buffalo correspondent kindly directs attention to an omission at Buffalo. The docks of the Buffalo, Rochester & Pittsburg Ry. Co. at that place were not included. These docks are well located, as they are on the Blackwell canal, not far from Michigan street. They have four McMyler and Excelsior revolving derricks and are now building two Brown hoists. After this year they will probably handle as much or more ore than any dock in Buffalo, the Tiff Farm plant being the only possible exception. They have handled very little ore in the past and may not handle over 30,000 or 40,000 tons this year.

David Kahnweiler of No. 437 Pearl street, New York, is the agent for the Wolverine marine engine, a machine for which great claims are made. This is what is said of it: "There is a rapidly increasing demand for some motive power to propel small boats and launches, more simple than the steam engine; something that can be used at all times, and so simple that it can be handled by anyone; that is economical, free from heat, smoke, dirt, dust or smell; absolutely free from fire or explosion; and can carry enough cheap fuel for a week or month's cruise. The Wolverine marine engine meets these requirements. It has no gearing on the engine or propeller shaft. It can be reversed by simply moving one lever. It has an impulse at every revolution. It has a solid propeller wheel; and propeller shaft and crank shaft are rigidly connected together. It can be run slow or fast, at will. With the propeller wheel always rigidly connected to the crank shaft, the motor can not 'run away' and jar the boat to pieces. Its weight and the room it occupies is far below that of any other motor. A 4 horse-power engine has a base 15 inches square, is 24 inches from bottom of base to top of cylinder, and weighs under 450 pounds. It uses but one gallon of common stove gasoline per horse power per day of ten hours when working full power. It is free from any possibility of fire or explosion and requires no licensed engineer or pilot. The price of this engine includes propeller wheel, shaft, stern bearing and stuffing box, battery and solid steel case hardened wrenches."

The Nickel Plate road sells homeseekers' excursion tickets to the south, June 16, July 17 and 21, Aug. 4 and 18, Sept. 1 and 15, Oct. 6 and 20. For detailed information write any agent of the Nickel Plate road, or address B. F. Horner, general passenger agent, Cleveland, O. 103-30

You save from \$1.50 to \$3.00 by purchasing tickets via the Nickel Plate road. Solid trains and through sleeping cars between Chicago, Buffalo, New York and Boston. 136 July 3

Round trip excursion tickets between Cleveland Lorain may be secured via the Nickel Plate road at \$1.00. 79 July 31



# Emerald Boiler Oil

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Best results can be secured by feeding **Emerald Boiler Oil** to the boiler drop by drop, regularly and continuously, from a sight feed lubricator or injector attached to the feed water pipe between the pump and the boiler or heater; preferably to a horizontal pipe, or to a vertical pipe in which the water moves upward.

Fed in this way the supply can be regulated in accordance with the conditions and the oil will not only remove scale, but will keep the boiler free from it after it has once been cleaned.

If the boiler is badly scaled the oil should be fed freely on the start, the quantity being reduced as the boiler becomes cleaner. After the old scale is removed it should be fed very moderately.

## WHAT IT DOES.

What **Emerald Boiler Oil** does may best be learned from the experience of those who have used it.

**EMERALD BOILER OIL** is being used on many of the large steamers with most satisfactory results.

Address Correspondence to **Standard Oil Company,** Lubricating Department  
**CLEVELAND, O.**

It is computed by high authorities that One Sixteenth of an inch of boiler scale adds 15 % to the fuel account.  
One Fourth of an inch of boiler scale adds 60 % to the fuel account

## STORM OIL.

Brief Rules for the Use of Oil to Protect Vessels in Stormy Waters.

In the illustrative figures, the flowing lines represent the spreading oil and the arrows the direction of the wind and sea.

Scudding before a gale, figure 1, distribute oil from the bow by means of oil-bags or through waste-pipes, it will thus spread aft and give protection both from quartering and following seas.

If only distributed astern, figure 2, there will be no protection from the quartering sea.

Running before a gale, yawing badly and threatening to broach-to, figures 3 and 4, oil should be distributed from the bow and from both sides, abaft the beam.

In figure 3, for instance, where it is only distributed at the bow, the weather quarter is left unprotected when the ship yaws.

In figure 4, however, with oil-bags abaft the beam as well as forward, the quarter is protected.

Lying-to, figure 5, a vessel can be brought closer to the wind by using one or two oil-bags forward, to windward. With a high beam sea, use oil-bags along the weather side at intervals of 40 or 50 feet.

In a heavy cross-sea, figure 6, as in the center of a hurricane, or after the center has passed, oil-bags should be hung out at regular intervals along both sides.

Drifting in the trough of a heavy sea, figures 7 and 8, use oil from waste-pipes forward and bags on weather side, as in figure 8.

These answer the purpose very much better than one bag at weather bow and one at lee quarter, although this has been tried with some success, see figure 7.

Steaming into a heavy head-sea, figure 9, use oil through forward closet-pipes. Oil-bags would be tossed back on deck.

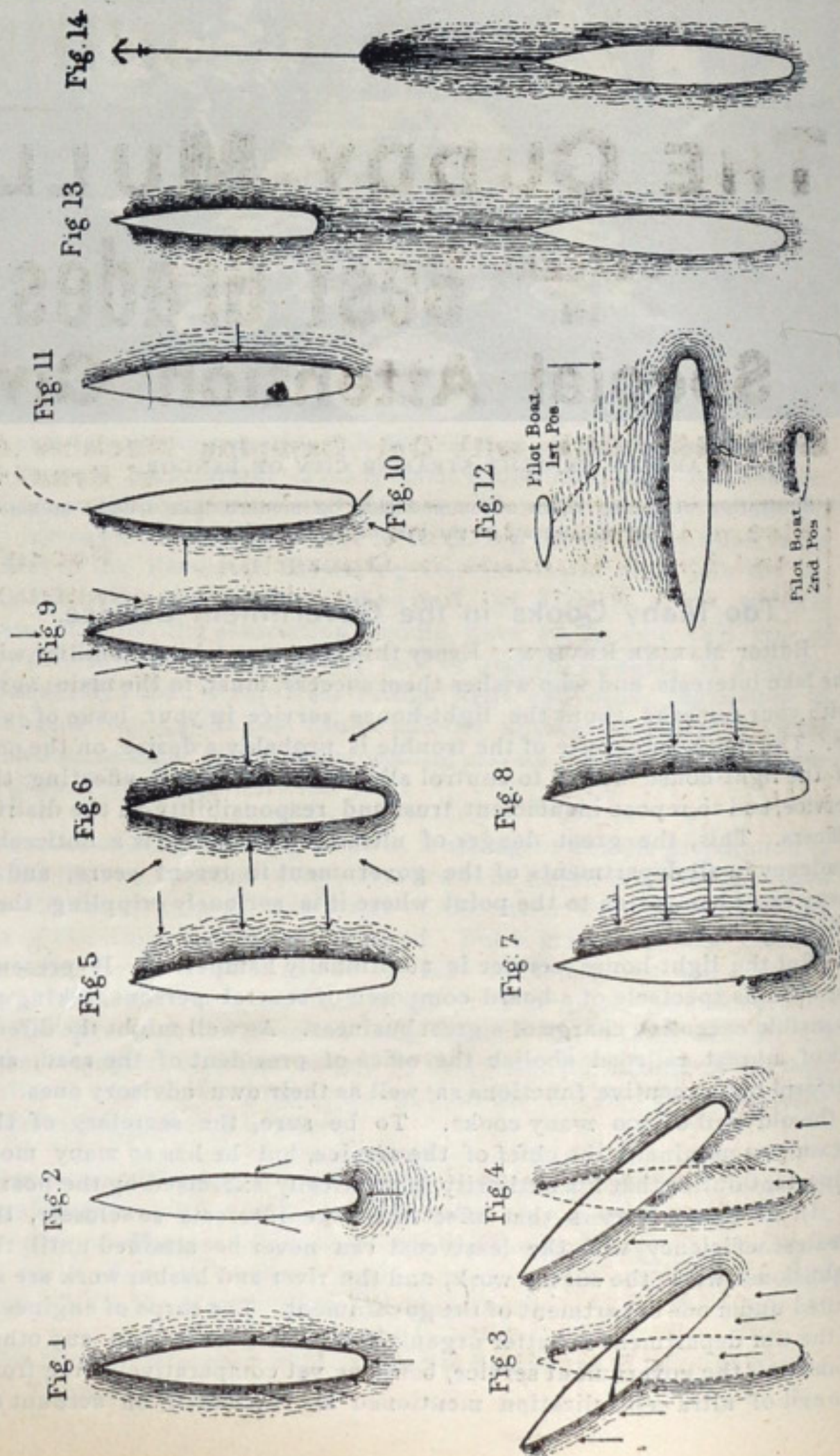
Lying to, to tack or wear, figure 10, use oil from weather bow.

Cracking on, with high wind abeam and heavy sea, figure 11, use oil from waste-pipes, weather bow.

A vessel hove-to for a pilot, figure 12, should distribute oil from the weather side and lee quarter. The pilot-boat runs up to windward and lowers a boat, which pulls down to leeward and around the vessel's stern. The pilot-boat runs down to leeward, gets out oil-bags to windward and on her lee quarter, and the boat pulls back around her stern, protected by the oil. The vessels drift to leeward and leave an oil-slick to windward, between the two.

Towing another vessel in a heavy sea, oil is of the greatest service, and may prevent the hawser from breaking. Distribute oil from the towing vessel forward and on both sides, figure 13. If only used aft, the tow alone gets the benefit.

At anchor in an open roadstead, use oil in bags from jib-boom, or haul them out ahead of the vessel by means of an endless rope rove through a tail-block secured to the anchor-chain, figure 14.

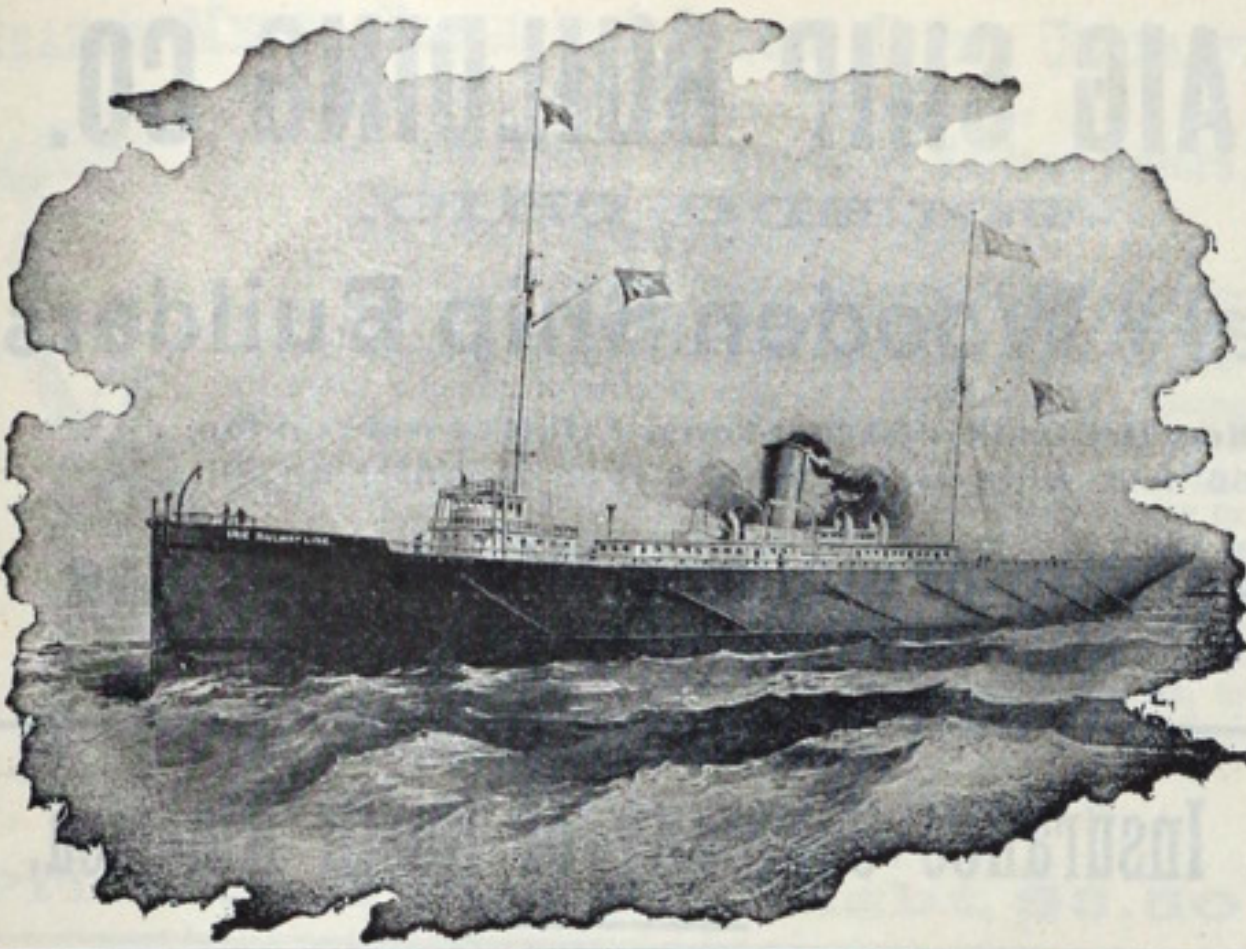


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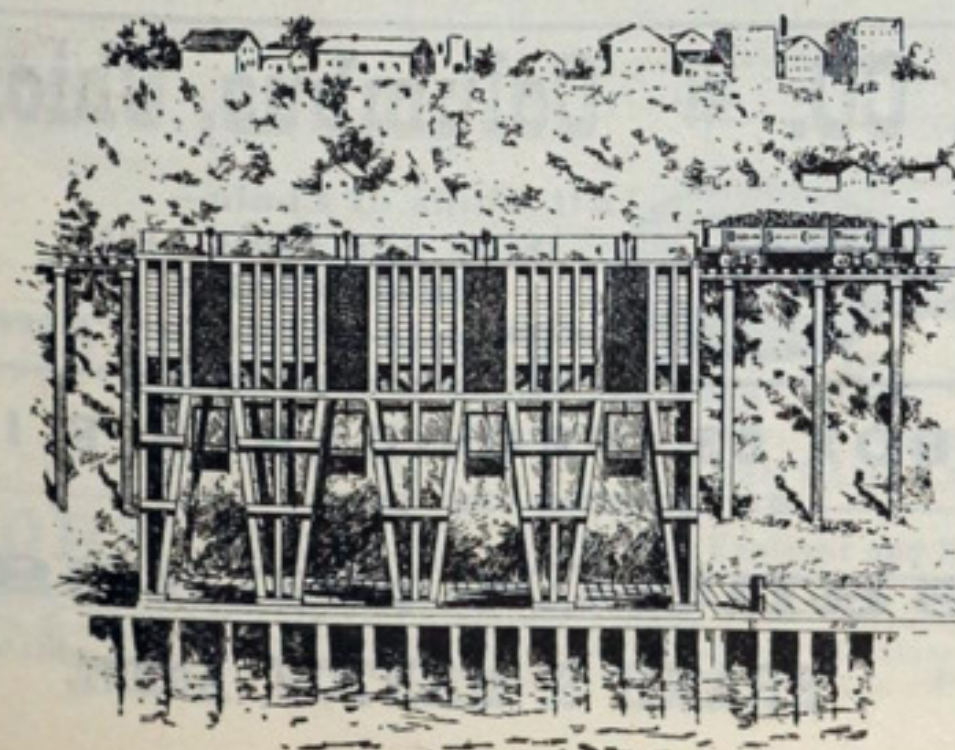
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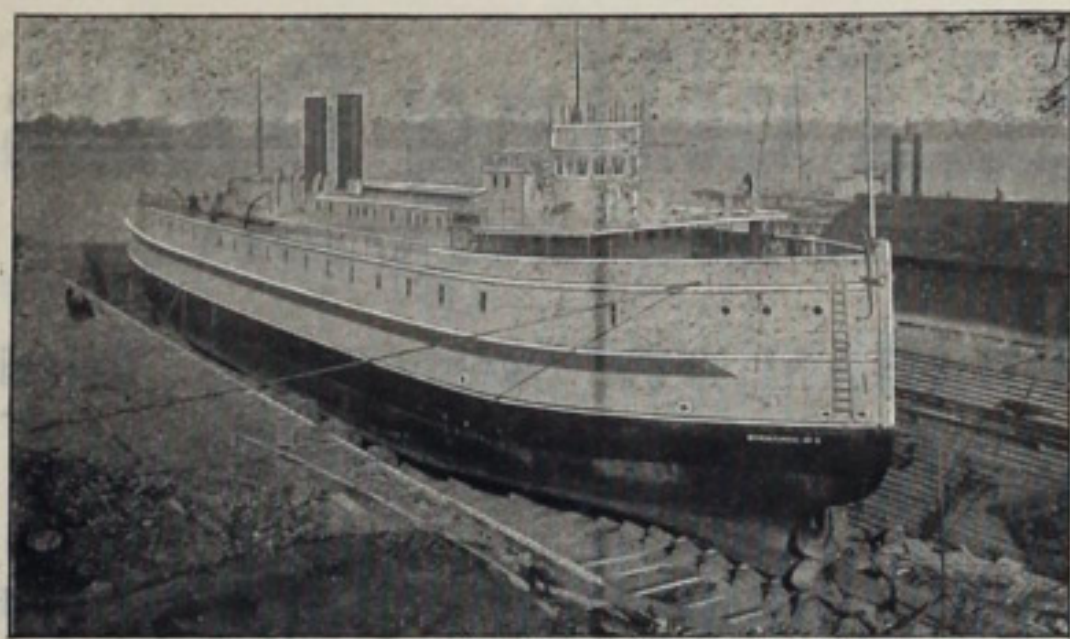
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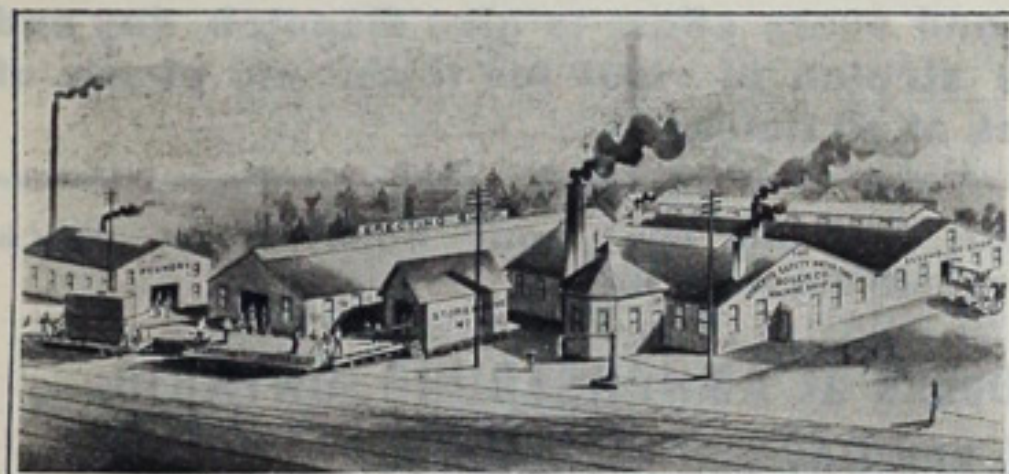
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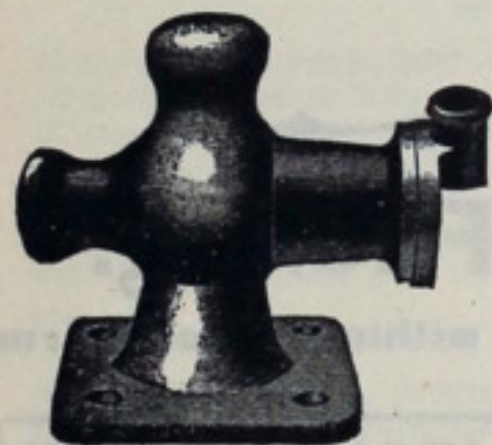
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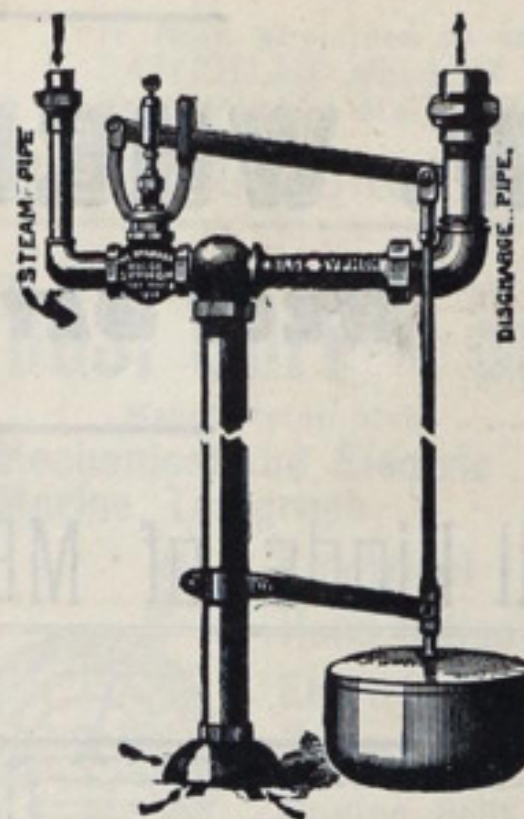


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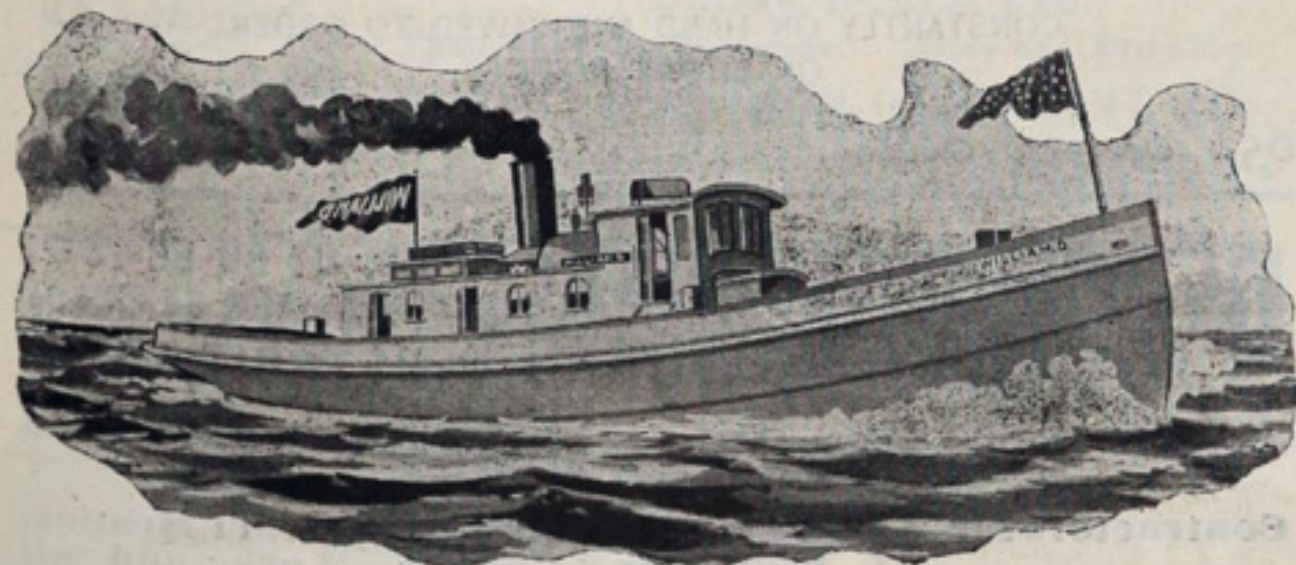
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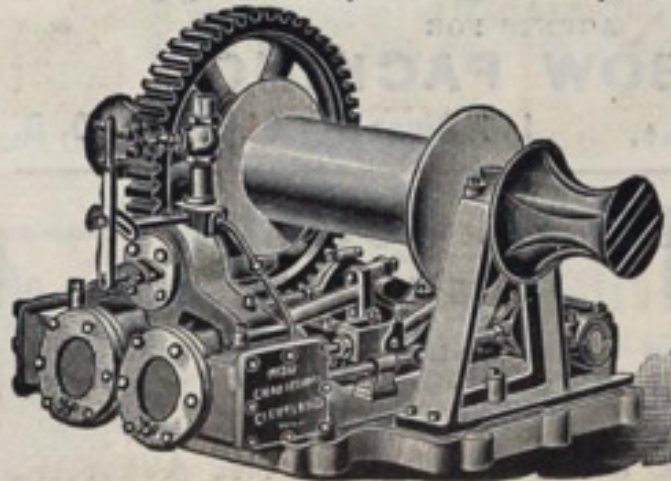
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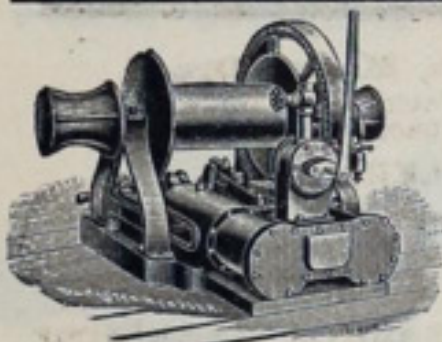
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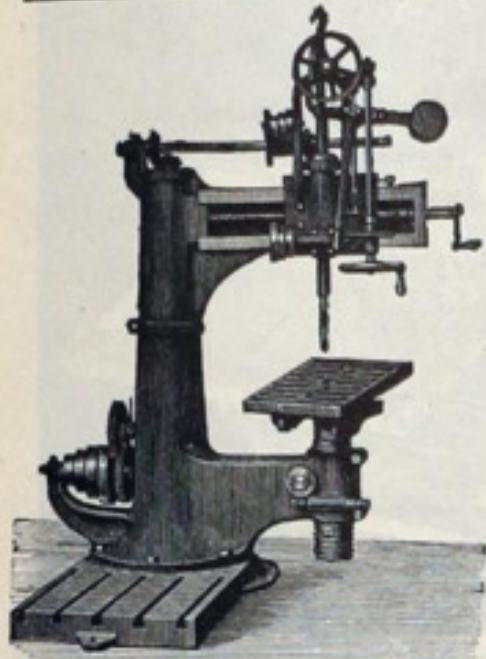
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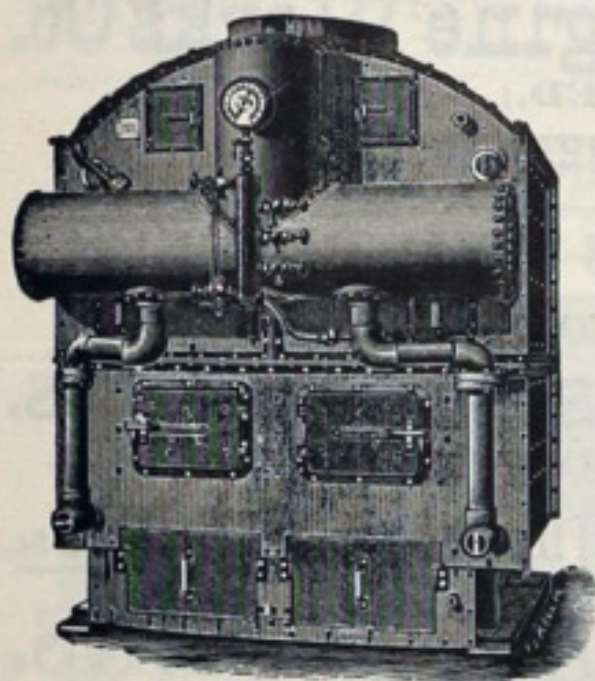
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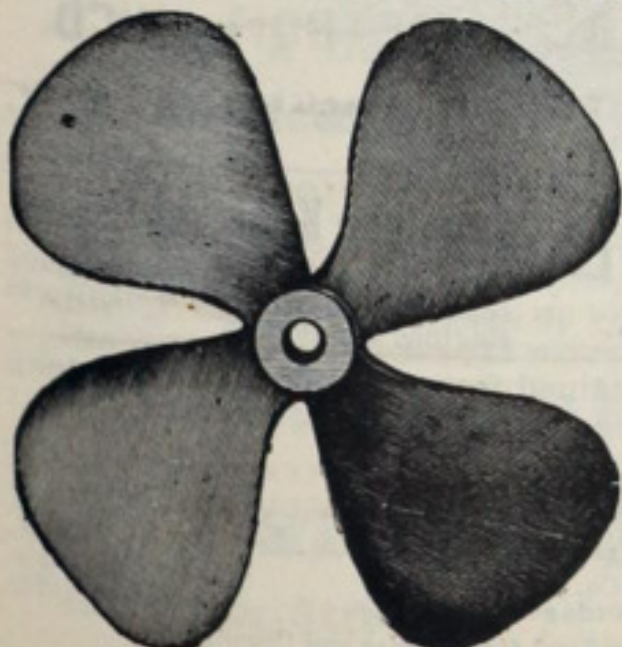
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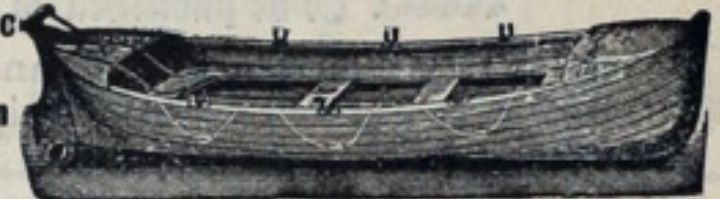
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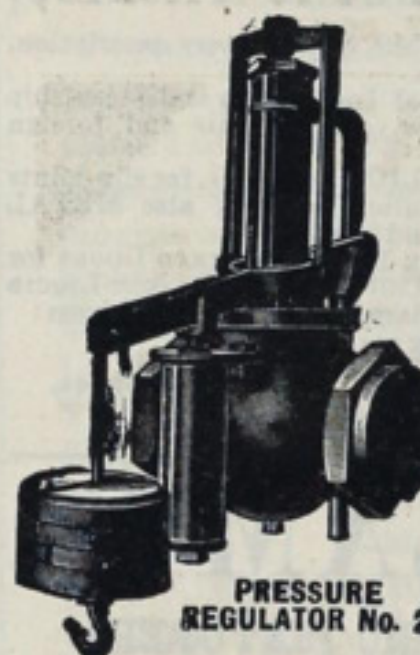
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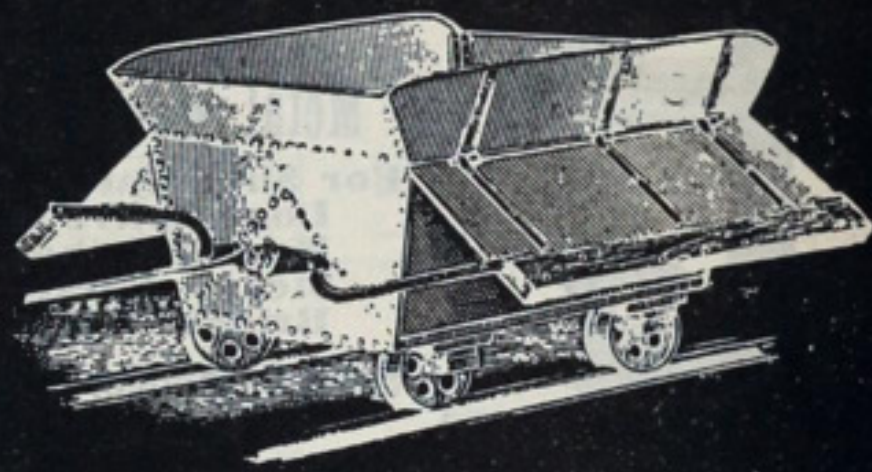
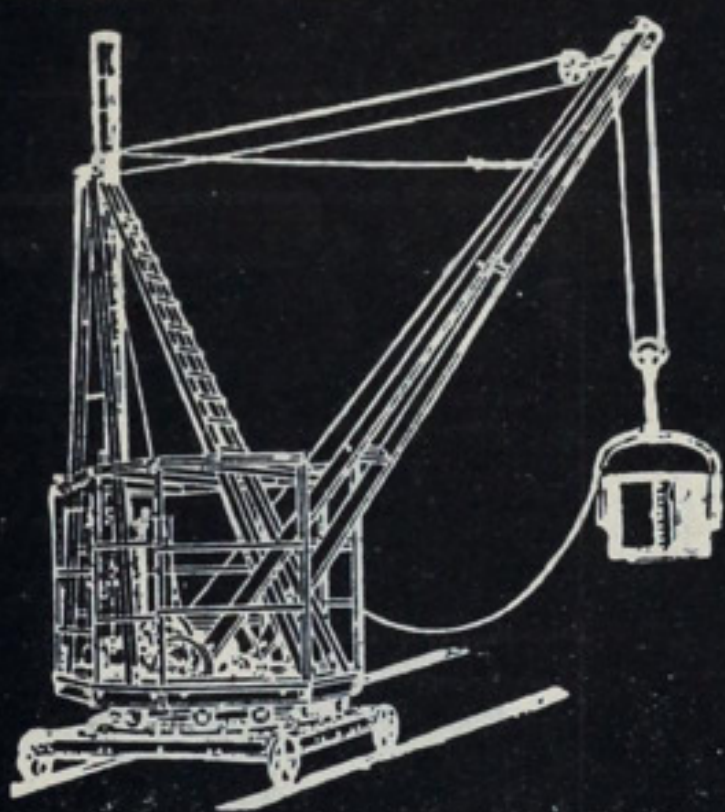
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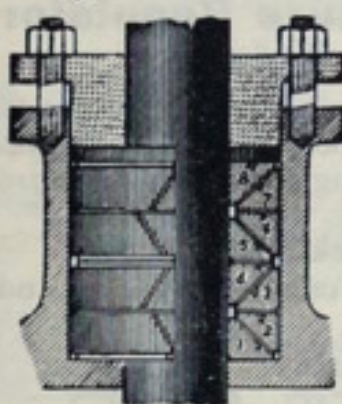
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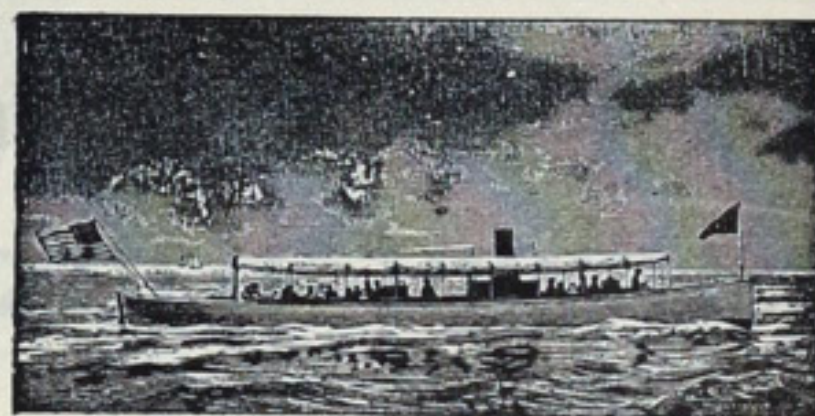
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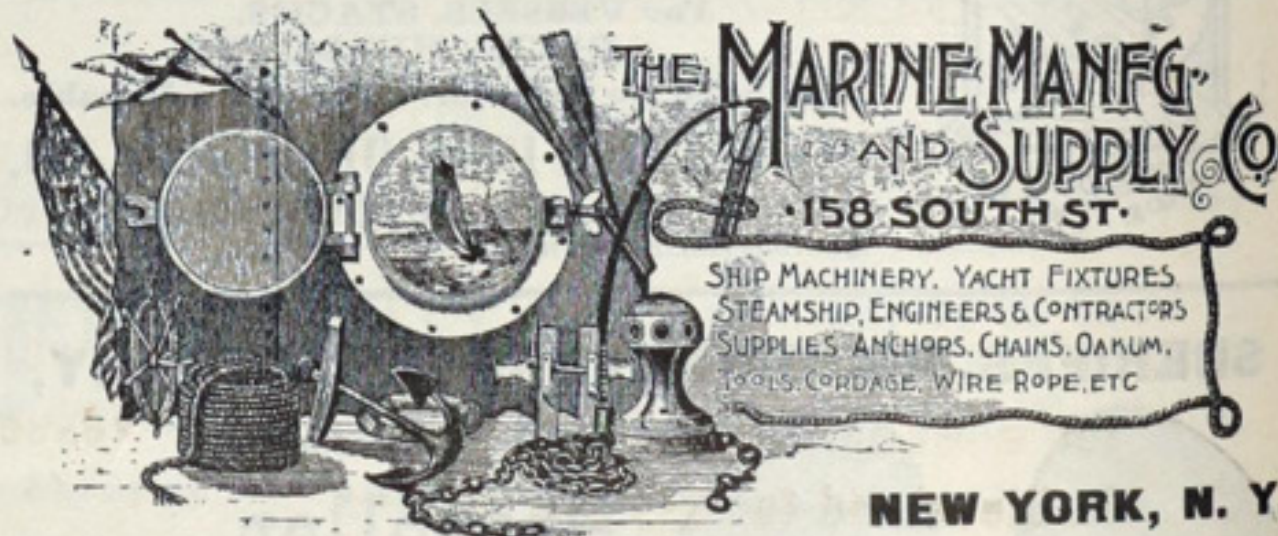
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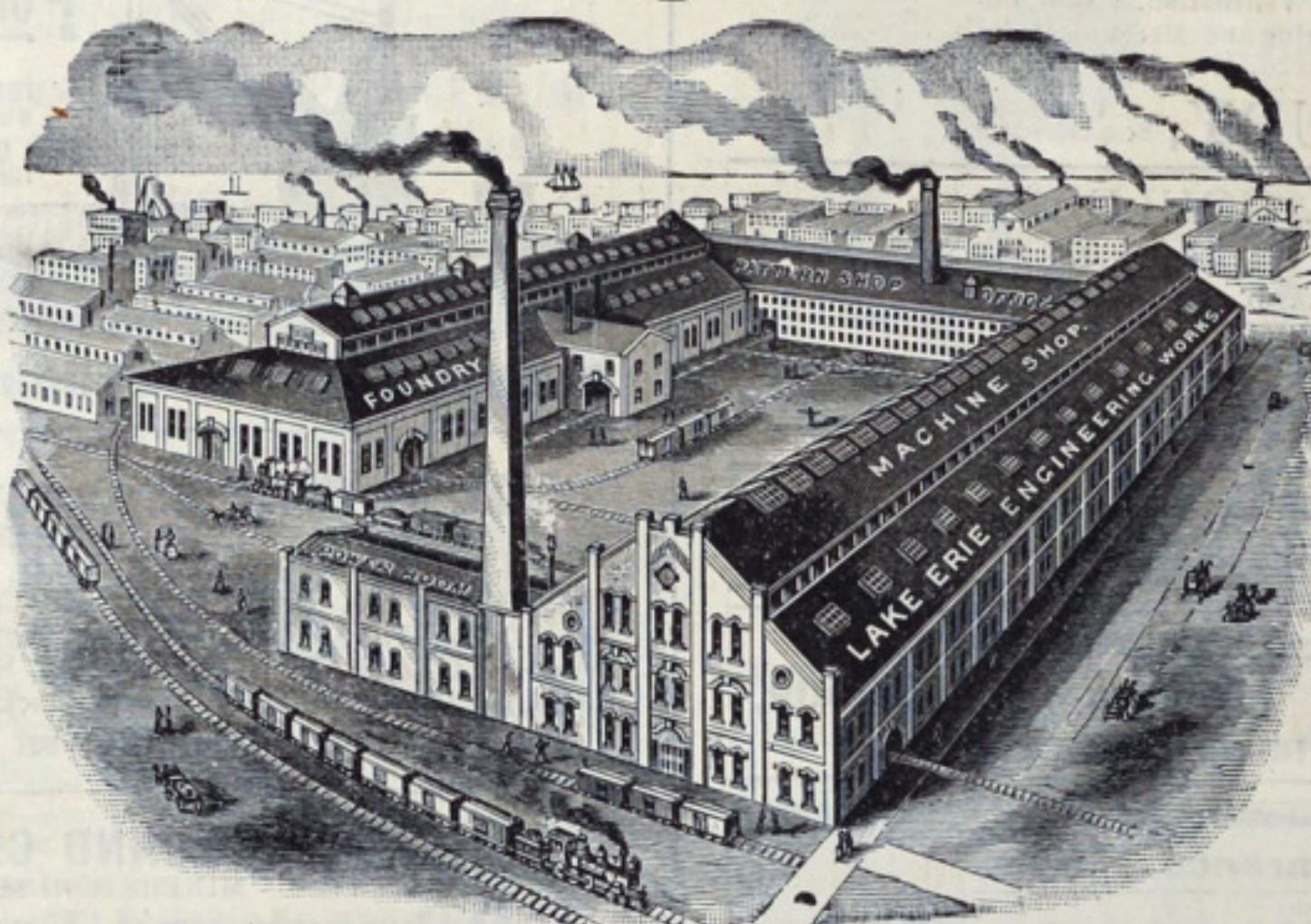


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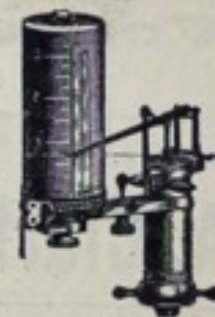


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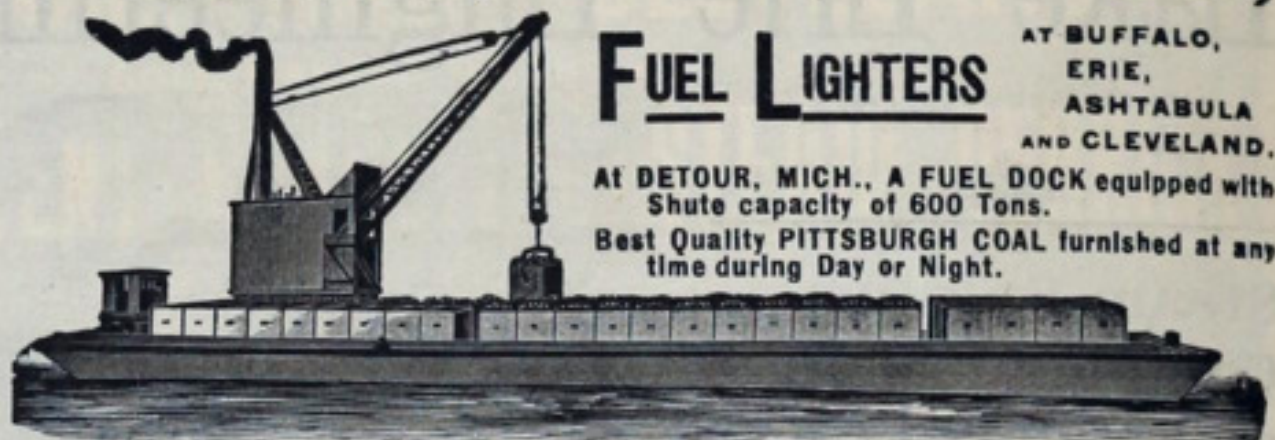
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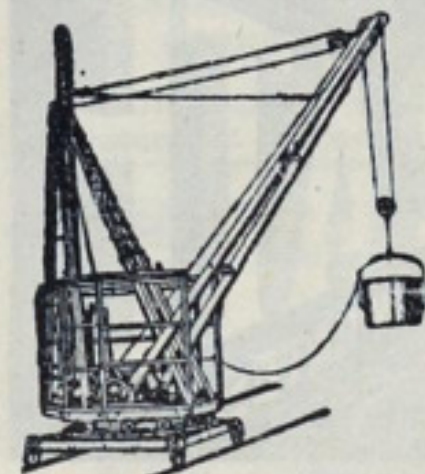
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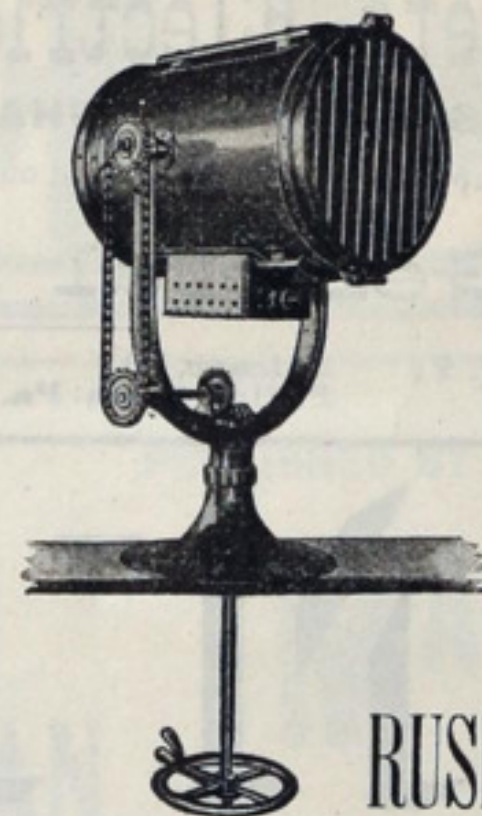
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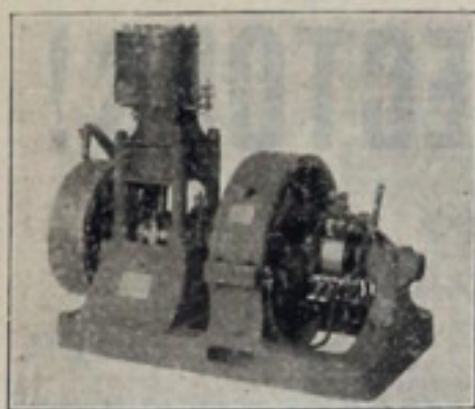
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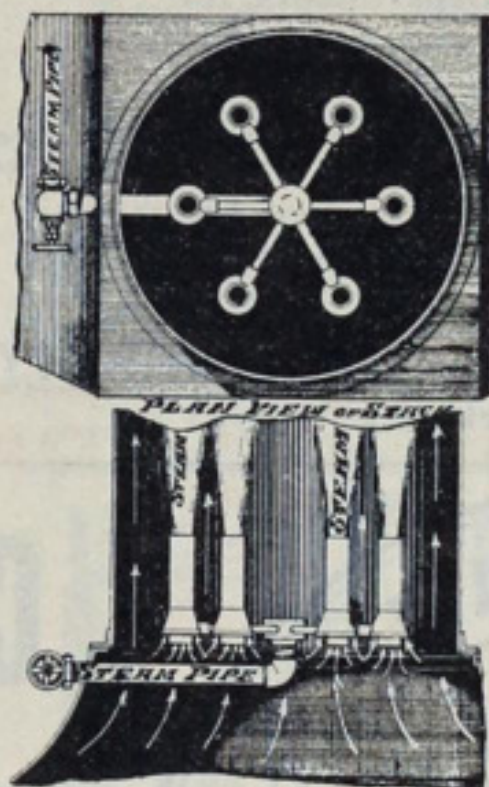
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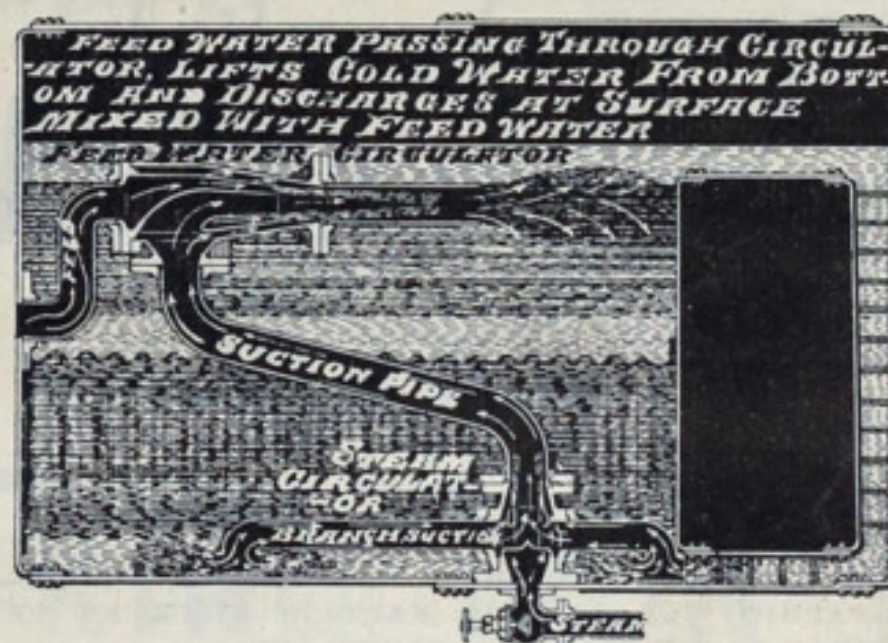


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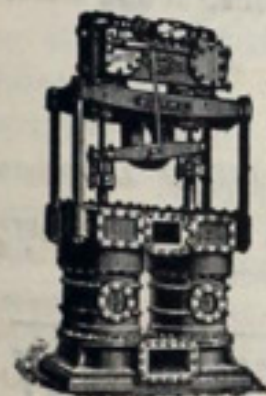
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Single and Duplex Pumps for Boiler Feed,  
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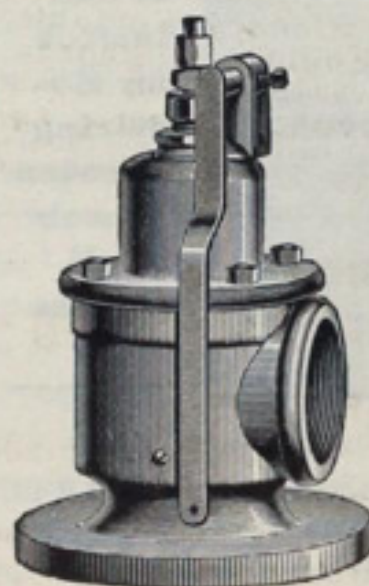
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NORTHERN STEAMSHIP CO.  
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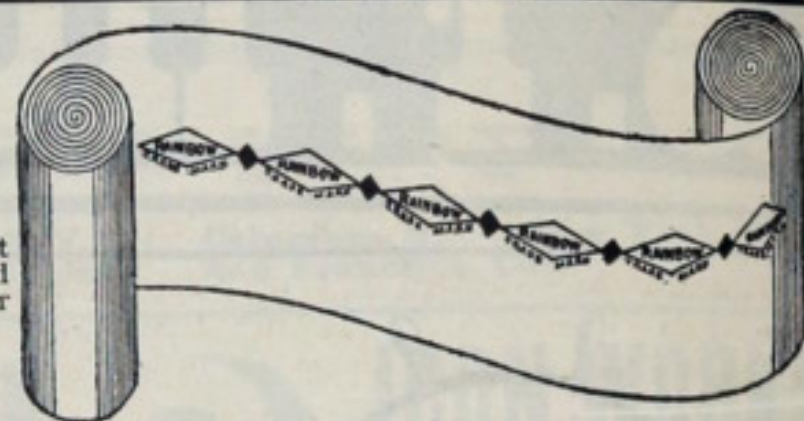
On board Steamship North Land, September 12, 1895.

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I have used Rainbow Packing for steam and hot water pressures of 266 lbs. and 500 to 600 lbs. respectively, and find it superior to all others. Before using Rainbow Packing I tried various other packings, including corrugated copper, and found that they would not hold. I therefore tried Rainbow Packing and can cheerfully recommend it as being the only packing for all high pressures in the market to-day.

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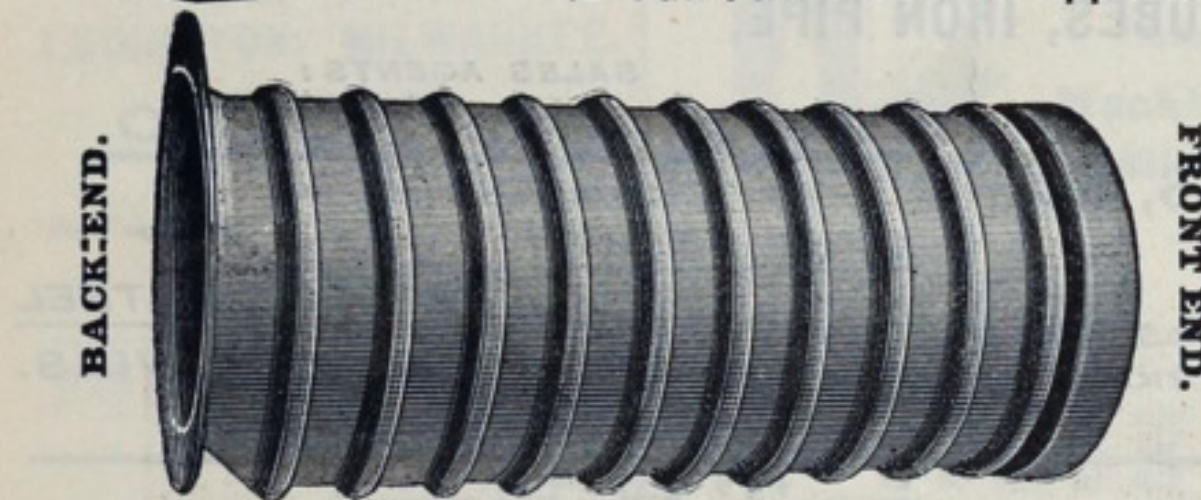
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Show an average economy in fuel of 15 per cent. In steamers this means not only so much saving in cost of coal or increased power, but additional freight capacity.

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With this style of Furnace Flue the rivets at the "back ends" are out of the line of fire, and all that has to be done to remove it is to cut out the rivets at the ends and slip it through the front; and to replace it, simply to slip it back in its place and rivet up the ends again without disturbing any part of the boiler. No smithwork is required to fit it on a boiler or to refit it when replaced. It is ready for use as it comes from the manufacturers. This style of flue has been in use six years without a single complaint.

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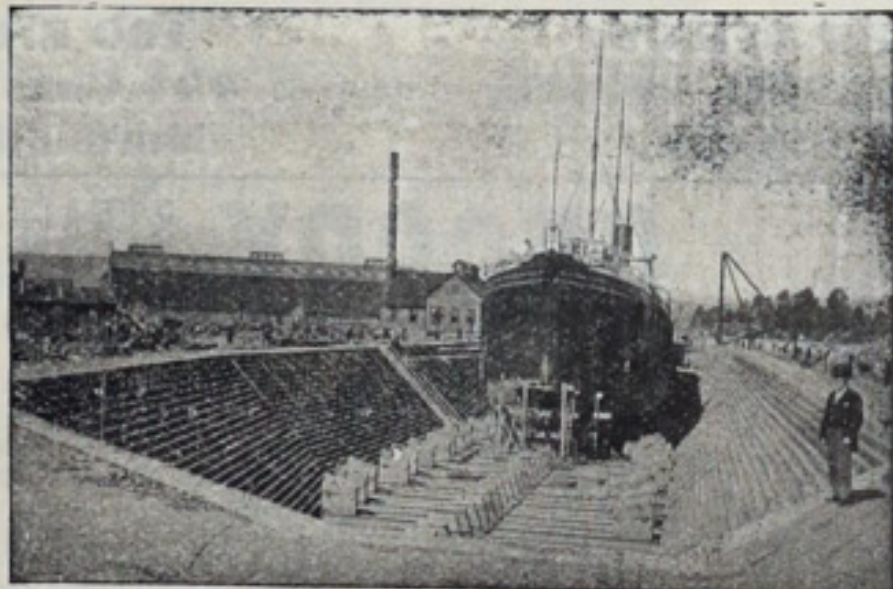
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Of all classes built on the Shortest Possible Notice at our yards at

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Photograph of 300 ft. Boat in Dock.

Plates & Material Always on hand to Repair all kinds of Metal Ships in Shortest Time.



Best Quality of Oak instock for Repairing Wooden Vessels of all Classes.

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Length, extreme.....537 feet.	Entrance, Top.....55 feet 9 in.
Breadth, Top.....90 " 4 in.	Entrance, Bottom.....50 "
Breadth, Bottom.....52 "	Depth over Sills.....18 "

### LARGEST DRY DOCK ON THE LAKES.

Prices for Repairs and Docking same as at lower lake ports

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A number of Propellor Wheels instock at Dry Dock.

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ASBESTOS MATERIALS OF ALL KINDS.

Wicking, Fibre, Mill Board, Felt, Packing, Cement, Liquid Paints, Roof Paints, Fire-Proof, Paints, etc.

Made in Sections Three Feet Long, to Fit Every Size of Pipe.

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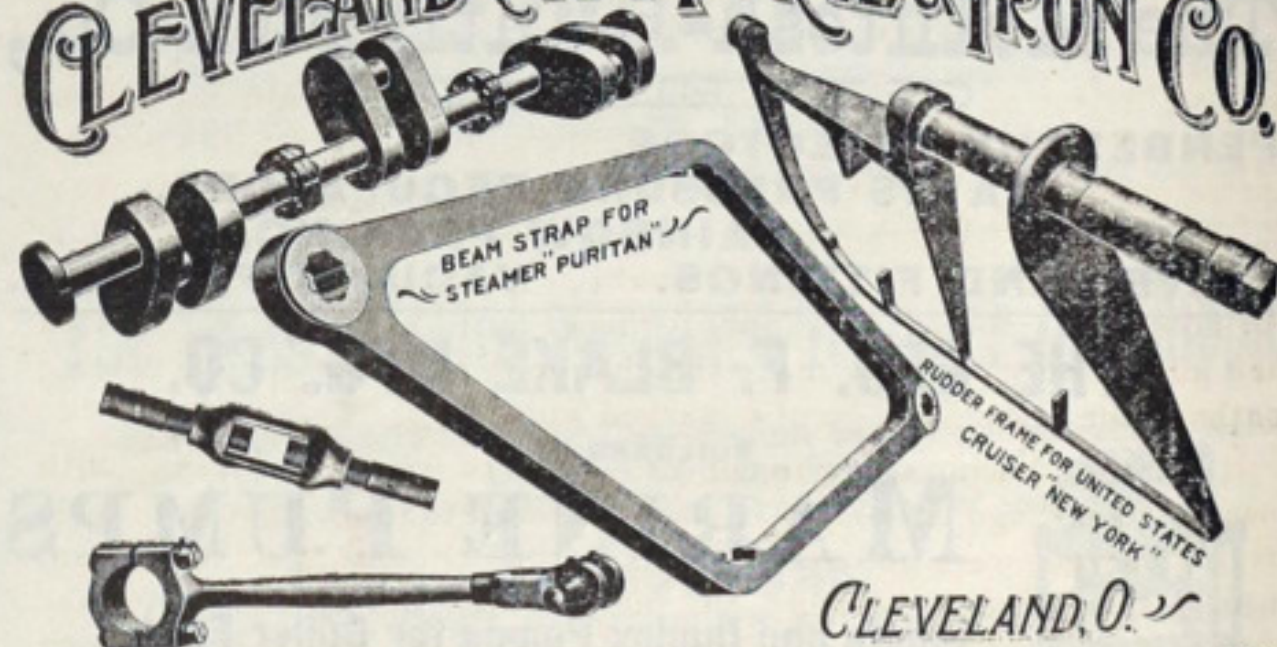
REPAIRING A SPECIALTY.

Dimensions of Dock:

Lth. over all, 360 ft.  
Lth. on blocks, 340 ft.  
Width of gate, 50 ft.  
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IRON OR STEEL FORGINGS FINISHED COMPLETE, ROUGH MACHINED OR SMOOTH FORGED ONLY, OF ANY WEIGHT. COUPLING LINKS AND PINS. PRESSED WROUGHT IRON TURNBUCKLES. CAR IRON SPECIALTIES.



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